FINAL

US Army Corps
of Engineers
HUNTSVILLE ENGINEERING
SUPPORT CENTER

Defense Environmental Restoration Program
for
Formerly Used Defense Sites

Ordnance and Explosives
Chemical Warfare Materials

ARCHIVES SEARCH REPORT FINDINGS

ARMSTRONG COUNTY AIR-TO-AIR GUNNERY RANGE

Dewey and Sully Counties, South Dakota

Project No. B08SD081901

SEPTEMBER 1996

Prepared by
US ARMY CORPS OF ENGINEERS
ST. LOUIS DISTRICT

ORDNANCE AND EXPLOSIVES
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1.0 Introduction

1.1 Authority

In 1986, Congress established the Defense Environmental Restoration Program at 10 U.S.C. 2701 et.seq. This program directed the Secretary of Defense to "carry out a program of environmental restoration at facilities under the jurisdiction of the Secretary."

In March, 1990, the EPA issued a revised National Contingency Plan. Under 40 C.F.R. 300.120, EPA designated DOD to be the removal response authority for incidents involving DoD military weapons and munitions under the jurisdiction, custody and control of DoD.

Since the beginning of this program, the U.S. Army Corps of Engineers has been the agency responsible for environmental restoration at Formerly-Used Defense Sites (FUDS). Since 1990, the U.S. Army Engineering and Support Center, Huntsville, has been the Mandatory Center of Expertise and Design Center for Ordnance and Explosives.

1.2 Subject

The former Armstrong County Air-to-Air Gunnery Range consisted of approximately 404,439 acres and was used for training exercies by pilots stationed at various airfields during World War II. The site is located approximately six miles east of Eagle Butte in Dewey and Sully Counties, South Dakota.

1.3 Purpose

This Archives Search Report (ASR) compiles information obtained through historical research at various archives and records holding facilities, interviews with persons associated with the site or its operations, and personal visits to the site. All efforts were directed towards determining possible use or disposal of ordnance and/or CWM on the site. Particular emphasis was placed on establishing the type of munitions, quantities and area of disposal. Information obtained during this process was used in developing recommendations for further actions at the site.

1.4 Scope

The entire site of the former precision bombing range, consisting of 404,439.41 acres, was evaluated in assessing the potential for OE contamination. It is designated as DERP-FUDS Site No. B08SD081901.

This report presents the history of the site, description and characterization of the immediate surrounding area, real estate ownership information, findings of a visual field survey, and OE site analysis, including an evaluation of potential ordnance contamination. A separate **Executive Summary** supplements these ASR FINDINGS and furnishes the CONCLUSIONS and RECOMMENDATIONS.

2.0 Previous Investigations

2.1 Corps of Engineers Documents

Under the Defense Environmental Restoration Program, the Omaha District prepared a Project Inventory Report (INPR) which contained a Findings and Determination of Eligibility (FDE), for the subject Armstrong County Air-to-Air Gunnery Range. The FDE states that the site, acquired in 1943, was used in support of Pierre Army Air Field, Fairmont Army Air Field, Harvard Army Air Field, and Bruning Army Air Field. The site was determined to be eligible for the Defense Environmental Restoration Program for Formerly Used Defense Sites as established under 10 USC 2701 et seq. A RAC score of 3 was assigned. A copy of the INPR is included at Appendix D.

A February 1993 site inspection by the Omaha District did not find evidence of ordnance except for some .50 caliber points and casings displayed by one of the landowners.

The INPR stated that a Certificate of Clearance (COC) had not been located for the subject site.

2.2 Other Reports

No other site investigation reports were obtained during the archive search.

3.0 Site Description

3.1 Land Usage

3.1.1 Location

The former Armstrong County Air-to-Air Gunnery Range, consisting of 404,439.41 acres, is located approximately six miles east of Eagle Butte, South Dakota. The majority of the site is within the boundaries of Dewey County with a portion in Sully County.

3.1.2 Past Use

Prior to DoD acquiring usage of the land, it was used for grazing and agriculture.

3.1.3 Current Uses

The majority of the land is used for grazing with some small farming operations.

3.2 Climatic Data

The site is located in a continental climate, with frequent daily temperature fluctuations and distinct seasons. Winters generally is cold and dry with storms of short duration. Normal temperatures for the season are in the middle teens and precipitation is mainly in the form of snow. Seasonal snowfall has varied from under 9 inches to over 75 inches. Blizzard type storms occur on occasion but are infrequent. Average yearly snowfall is a little under 33 inches.

Spring is characterized by marked increases in both temperature and precipitation. Nearly one-third of the annual rainfall occurs during the spring months

Summers are hot but not extreme. Temperatures of 100 degrees or over usually occur three or four times a year, but nights are normally cool and comfortable. Summertime precipitation is mainly in the form of showers and thunderstorms. Hail occurs about 2 times a year on the average with the thunderstorms.

Autumn is a very pleasant season with mild warm days, cool nights, and plentiful sunshine.

The prevailing winds are south southeasterly every month of the year except February which is northwesterly. The winds are persistently strong most of the year, but highest in March, April and May and lowest in July and August.

At noon, the mean relative humidity is 67 percent in January, 54 percent in April, 53 percent in July, and 53 percent in October.

In Huron, the sun shines for about 55 percent of the daylight hours in winter, and for more than 75 percent in summer. Skies are clear about 29 percent of the time, partly cloudy about 29 percent and cloudy about 42 percent.

Climatological data for the area are summarized in TABLE 3-1. Data were collected at the National Weather Service meteorological station at the Huron Regional Airport. The site is located approximately 80 miles northwest of the Regional Airport.

CLIMATOLOGICAL DATA FOR
HURON, SOUTH DAKOTA
TABLE 3-1

Month	Temperature		Precipitation	Wind	
	Average Minimum (°F)	Average Maximum (°F)	Average (Inches)	Average Speed Miles/Hour	Average Direction
January	2.3	24.1	0.41	11.4	SSE
February	9.1	29.7	0.68	11.3	NW
March	21.7	42.1	1.66	12.4	SSE
April	34.0	58.6	2.09	13.4	SSE
May	44.8	70.4	2.87	12.3	SSE
June	55.5	80.3	3.35	11.2	SSE
July	61.7	87.1	2.67	10.3	SSE
August	58.8	84.8	1.97	10.5	SSE
September	47.3	74.2	1.72	11.2	SSE
October	35.4	61.5	1.47	11.2	SSE
November	21.8	43.0	0.72	11.6	SSE
December	7.8	28.3	0.47	11.1	SSE
Average	33.4	57.0	20.08	11.5	SSE

3.3 Geology and Soils

3.3.1 Geology

The site is located in the southern Missouri Plateau - Unglaciated Section of the Great Plains Province. The Missouri Plateau is generally comprised of old plateaus, terrace lands, local badlands, and isolated mountains. The Armstrong Gun Range lies just north of the White River Badlands or "Big Badlands" which has characteristics of steep slopes along with numerous and closely spaced drainage lines. North of the badlands is a single widespread rolling upland which seems to represent a once continuous surface from which the newer and sharper relief has been carved. At the site, this general level is cut on shale (Pierre formation) which contains almost no sandstone beds (Fenneman 1931).

The Pierre formation has a total thickness of about 1400 feet; however, a maximum of only 200 feet is exposed in the area. Of this exposure the upper 30 to 40 feet are the most significant for structural mapping. The Pierre is called shale, and in general, the exposures of massive appearing soft rock do have the appearance of a typical uniform shale. The color is usually medium to dark gray when dry and black when wet, but may be buff, brown or mottled gray and brown near the top of the formation. Close inspection reveals that the upper Pierre contains considerable silt and becomes more silty towards its top. At some exposures the rock consists largely of very thin streaks of clay shale intercalated with very thin streaks of silt (Morgan and Petsch 1945).

3.3.2 Soils

The site soils are composed of several different soil profiles. The area is large and the terrain differs drastically from location to location. The majority of the soils fall into three soil profiles. These profiles are intermingled with each other throughout the site. The first profile consists of shallow, well drained, sloping to very steep, calcareous clayey soils on the higher parts of the landscape. The surface layer was formed in material from the underlying shale. This soil is a light brownish-gray, highly plastic clay found to a depth of 10 inches. It is hard when dry and friable when wet. The subsoil is shale found to a depth of 60 inches. The soil properties of the first profile are shown below.

Soil Profile

DEPTH (in)	SOIL DESCRIPTION	PERCENTAGE PASSING SIEVE NUMBER			LIQUID LIMIT	PLAS-TICITY INDEX
		#4	#40	#200		
0-10	highly plastic clay	100	95-100	85-100	60-90	28-55
10-60	shale	100	95-100	85-100	60-120	31-85

Table taken from Soil Survey of Dewey County, SD

The second soil profile that is commonly encountered within the site area is similar to the above profile, but is found on the lower parts of the landscape and the depth of clay is deeper. The surface layer is a grayish-brown, highly plastic clay to a depth of 33 inches. It is extremely hard when dry, extremely firm when moist, and very sticky and plastic when wet. The subsoil is a very dark gray shale to a depth of 60 inches. A typical profile is shown in the following table.

Soil Profile						
DEPTH (in)	SOIL DESCRIPTION	PERCENTAGE PASSING SIEVE NUMBER			LIQUID LIMIT	PLAS-TICITY INDEX
		#4	#40	#200		
0-33	highly plastic clay	100	90-100	85-100	50-85	22-50
33-60	shale	100	95-100	90-100	60	25-60
Table taken from Soil Survey of Dewey County, SD						

The third soil profile is similar to the second, but the depth of clay is shallower then the above profile. Again, the surface layer is a grayish-brown, highly plastic clay to a depth of 16 inches. The subsoil layer is multicolored platy shale to a depth of 60 inches. A typical profile is shown below.

Soil Profile						
DEPTH (in)	SOIL DESCRIPTION	PERCENTAGE PASSING SIEVE NUMBER			LIQUID LIMIT	PLAS-TICITY INDEX
		#4	#40	#200		
0-16	highly plastic clay	100	90-100	85-100	60-90	28-63
16-60	shale	100	95-100	90-100	75-115	50-80
Table taken from Soil Survey of Dewey County, SD						

The potential for frost development in the Armstrong Air-to-Air Gunnery Range site extends to a depth of 5 1/2 to 6 feet.

3.4 Hydrology

3.4.1 Ground Water

Ground water is one of South Dakota's most important natural resources. Ground-water reservoirs constitute a large and reliable source of water for domestic, industrial, stock, and

municipal use; although it's resources are utilized more in the east then the west. Shallow aquifers are absent or scarce in much of the State, but those that do exist are recharged by infiltration of precipitation that falls on the immediate area.

In Dewey County, artesian water from wells can be obtained over practically all of the county without undue cost due to the numerous deep aquifers. Only the major formations are discussed below. The Deadwood Formation consists of quartz sandstone interbedded with clay. It is approximately 450 feet thick and yields small to moderate amounts of water for stock and domestic supplies. The Winnipeg Formation, which overlies the Deadwood Formation, is about 180 feet thick. It is a sandstone unit which yields saline water under pressure. The water in this formation has not been used but reports estimate the yield to be about average. The Whitewood Dolomite and Red River Formation consists of massive, buff limestone and dolomite with a maximum thickness of about 550 feet. It contains an enormous volume of saline water under high artesian pressure at temperatures as high as 185°. These aquifers are not used as a source of water in South Dakota. The Madison Group ranges in thickness from 250 to 600 feet and is fine-grained limestone and dolomite containing numerous caverns, some which are lined with calcite crystals. It yields large quantities of good to saline water that is under high artesian pressure. The Inyan Kara Group is a conglomerate sandstone which has a maximum thickness of about 485 feet. It is a permeable and productive aquifer but it yields saline water that usually is under enough pressure to flow from wells. The supply is developed moderately and could support a larger withdrawal (US Geological Survey 1964).

In the area of the Armstrong Gun Range, there are bodies of shallow ground water. Domestic consumption is usually from these bodies, wherever the quality is good, and from reservoirs when acceptable (Rothrock and Robinson 1938).

3.4.2 Surface Water

The site is drained by many small creeks which generally flow to the south and east and discharge into either the Cheyenne River or the Missouri River which are part of the Lake Oahe Main Stem Reservoir project. No stream gages are located on any of the small creeks near the site. A US Geological stream gage on the Cheyenne River at the western boundary of the site has stage and flow records from 1920 through 1967. A new gage was established upstream on the Cheyenne River at Cherry Creek with records from 1961 to the present.

3.5 Ecology

The information on the endangered and threatened species for this site has been provided by the U.S. Fish and Wildlife Service (USFWS) and the South Dakota Department of Game, Fish and Parks (DGFP).

The USFWS provided the following list of Federally-listed species that includes candidate, threatened and endangered species for Dewey, Haakon, Stanley, Sully, and Potter counties, South Dakota: American burying beetle (Nicrophorus americanus), endangered; sturgeon

chub (Hybopsis gelida), candidate; sicklefin chub (Hybopsis meeki), candidate; pallid sturgeon (Scaphirhynchus albus), endangered; black-footed ferret (Mustela nigripes), endangered; Swift fox (Vulpes velox), candidate; piping plover (Charadrius melodus), threatened; peregrine falcon (Falco peregrinus), endangered; whooping crane (Grus americana), endangered; bald eagle (Haliaeetus leucocephalus), endangered; and interior least tern (Sterna antillarum athalassos), endangered.

Literature provided by the DGFP listed the following state threatened and endangered species for Dewey, Haakon, Potter, Stanley and Sully counties, South Dakota: pallid sturgeon, endangered; northern river otter (Lutra canadensis), threatened; black-footed ferret, endangered; Swift fox, threatened; whooping crane, endangered; bald eagle, endangered; interior least tern, endangered; and piping plover, threatened. Lake Oahe, located on the Missouri River, is an important area that is used heavily by nesting interior least tern and piping plover.

No additional information on the occurrence of rare or endangered species or natural communities is known at this time. This does not mean that other state or federally-listed species may not be present within the areas of interest. An on site inspection by appropriate state and federal personnel may be necessary to verify the presence, absence, or location of listed species, or natural communities if remedial action is recommended as part of the final ASR.

3.6 Demographics

3.6.1 Center of Activity

The Armstrong County Air-to-Air Gunnery Range site is located near the City of Eagle Butte, Dewey County, South Dakota. A portion of the site is also located in Sully County, South Dakota.

3.6.2 Population Density

CITY/COUNTY	CITY: Eagle Butte	COUNTY: Dewey
AREA (sq. mi.)	1.8	2,303
POPULATION	489	5,563
POP DENSITY	271.7persons/sq.mi	2.42 persons/sq.mi.

CITY/COUNTY	COUNTY: Sullly
AREA (sq. mi.)	1,007
POPULATION	1,552
POP DENSITY	1.54 persons/sq.mi.

3.6.3 Types of Businesses and Industry

The number of business establishments in the Eagle Butte area can be broken down by type as follows: manufacturing 4.4%; agriculture 1.1%; trade 42.2%; services and financial 27.8%; and other 24.4%. Of the people in the area employed by businesses, approximately 1.68% are unclassified. Prominent employers in the area are trade and financial businesses at about 61.0%, services at 23.2%, manufacturing at 3.36%, and 1.68% unclassified. Foregoing percentages are at mid-March 1992.

3.6.4 Types of Housing

Housing in Eagle Butte is composed of both single family and multi-family dwellings. The median value of 171 specified owner-occupied housing units in Eagle Butte is $23,200.

3.6.5 New Development in the Area:

In recent years Eagle Butte has aquired approximately 10 new businesses, lodging facilities, and a new law enforcement complex.

3.6.6 Typical Cross Sections of the Population:

Approximately 30.1% of the population of Eagle Butte City is White; 0% Black; 68.7% American Indian, Eskimo or Aleut; 1.0% Asian or Pacific Islander; and 0.2% other races. The percent of the total population (of any race) that is of Hispanic origin is 2.86%. The part of the population under the age of 18 is 27.9%, and the part over the age of 65 is 8.3%.

4.0 Historical Ordnance Usage

4.1 Historical Site Summary

In 1943, the War Department acquired from the Department of Agriculture, Department of Interior, and private individuals in the Counties of Armstrong and Sully, South Dakota, a total of 404,439.41 acres for use as the Armstrong Air to Air Gunnery Range. The Army Air Corps used Armstrong Air to Air Gunnery Range for aerial target practice. The Army Air Corps trained personnel in fighter planes from Pierre Army Airfield, Pierre, South Dakota; Fairmont Army Airfield, Fairmont, Nebraska; Harvard Army Airfield, Harvard, Nebraska; and Bruning Army Airfield, Bruning Nebraska. Due to its primary use by Pierre Army Airfield, the Army Air Corps also called the Site Pierre Air to Air Gunnery Range (Army Service Forces 1948).

The U.S. Army Corps of Engineers constructed 3 flight markers on the Range to guide aircraft to the target practice area. The U.S. Army Corps of Engineers made no other improvements to the Range. The Army Air Corps reported the use of only .50 calibre ammunition at the Range (Army Air Corps 1946a); (Army Air Corps 1946b). Lead planes used connecting cables to tow targets made of wire mesh. In 1947, the War Department declared Armstrong Air to Air Gunnery Range surplus to the needs of the military (Corps of Engineers 1949).

A bomb & shell disposal team from the U.S. Army Corps of Engineers issued two separate certificates of decontamination for the Armstrong Air to Air Gunnery Range, both dated 5 September 1947. One certificate pertaining to the portion of the site known as the Little Bend Area in Sully County states "a careful visual inspection" found the area "to be clear of all dangerous and/or explosive materials reasonably possible to detect. All the scrap metal on the bombing range has been disposed of..." (Corps of Engineers 1947a) The bomb & disposal team conducted the clearance operation on foot (Corps of Engineers 1947b). The War Department returned this portion of the Site, also known as the Little Bend Range and the Western Sully County Bombing Range, back to the Department of Agriculture (80 acres) and the Department of Interior (7,992.98 acres). The U.S. Army Corps of Engineers now owns this portion of the Site and uses the land as part of the Lake Oahe Main Stem Reservoir project.

Regarding the remaining portion of the Site, the other certificate of decontamination also states "a careful visual inspection" found the area "to be clear of all dangerous and/or explosive materials reasonably possible to detect. All the scrap metal on the bombing range has been disposed of..." (Corps of Engineers 1947c) Due the vast extent of this area, the bomb & disposal team conducted the inspection by vehicular patrol. Today, the Department of Interior, Bureau of Indian Affairs and the Cheyenne River Sioux Tribe, with a few individuals own the majority of the 396.366.43 acres. The owners use the land for grazing purposes and small farming operations.

4.2 Review of Historical Records

National Archives
8th & Pennsylvania
Washington, D.C. 20408
(202) 501-5671

The research team did not find any pertinent information.

National Archives at College Park
8601 Adelphi Road
College Park, MD 20740
(301) 713-6800

Record Group 341 - Records of Headquarters U.S. Air Force
Entry: 494
Box 22; Subject: Correspondence, Oregon thru Texas (disposal information on Pierre Air to Air Gunnery Range, SD; general installation information on Pierre AAF).

National Archives
Suitland Reference Branch
4205 Suitland Road
Suitland, MD 20409
(301) 457-7182

The National Archives and Records Administration transferred all pertinent record groups to the National Archives in Washington, D.C. or the National Archives at College Park, MD..

Washington National Records Center
4205 Suitland Road
Suitland, MD 20409
(301) 457-7010

The research team reviewed accession listings for RG 341 and RG 342 and did not find any pertinent information. Office box files were also checked for information.

National Personnel Records Center
Military Personnel Records
9700 Page Avenue
St. Louis, MO 63132-5100
(314) 538-4085

Record Group 342 - Records of U.S. Air Force Commands, Activities, and Organizations
Accession: 44-A-6003
Box 25 of 53; Subject: Awards & Decorations, 2d AF Bombing & Gunnery Ranges, Completions Reports (information on Pierre AAF and status of all ranges under the Second Air Force, 1943).

Box 30 of 53; Subject: Acquisition of land and amendments for Armstrong AA Gunnery Range; information on activities at the Armstrong County Aerial Gunnery Range).
Box 39 of 53; Subject: Designations and Activities for all sites (information on Armstrong County Air-to-Air Range; information on the use of Pierre Air-to-Air Range).
Box 40 of 53; Subject: Correspondence in establishment of Sioux City and Rapid City sites (status of Pierre ranges, 1943).
Box 41 of 53; Subject: Correspondence on usage of sites (descriptive information on the Pierre Air-to-Air Range; information on renewal of lease and change in jurisdiction over the Armstrong County Air-to-Air Gunnery Range; information on the renewal of leases for Rapid City Bombing and Gunnery Ranges; information on Second Air Force bases and ranges, 1943, includes Pierre AAF; status and projections for Second Air Force bombing and gunnery ranges, including the Armstrong County Range).
Box 47 of 53, Subject: Watertown Ranges, Pierre AFB (information in reference to the Pierre Bombing and Gunnery Ranges; information on incident at the Armstrong County Gunnery Range; references to other bombing and gunnery ranges under the Second Air Force and joint use; surplus information on Pierre Air to Air Gunnery Range).
Box 51 of 53; Subject: Sioux City, Harvard, Rapid City, Watertown, Armstrong

U.S. Air Force Historical Research Agency
600 Chennault Circle
Maxwell AFB, AL 36112-6424
(334) 953-2447

Record Group - Corps of Engineers, Base Units Material
Entry: IRIS 02045218 thru 02045244
Box: Sioux City; Sioux City Folders: 02045218-02045244 (information on the designation of the Armstrong County Air to Air Gunnery Range).

Record Group - Air Force Unit Histories
Entry: Decimal 287.50-34 (June 1946) thru 287.56-12 (May 1945)
Folders: 00176560 thru 00176575 (history of Pierre Army Air Field, September 1944; history of units at Pierre Army Air Field, April - June 1944; history of Pierre Army Air Field, February 1944).

U.S. Army Center of Military History
1099 14th Street, N.W.
Washington, D.C. 20005-3402
(202) 761-5416

The research team reviewed vertical and card files and did not find additional pertinent information.

Historical Office
U.S. Army Chemical-Biological Defense Command
Building E5183
Aberdeen Proving Ground, MD 21010-5423
(410) 671-4430

The research team reviewed the historical office files and did not find any additional pertinent information. Previously, the research team copied from the office files a CWM Report of Controlled and Other Critical Items of Equipment, dated 28 February 1945, pertaining to the 224th Base Unit at Sioux City Army Base. CWM items in the report include two HS Vapor Detector Kits, M4; aircraft smoke tanks; and decontaminating apparatus. Also, the research team copied from the office files a CWM Report of Controlled and Other Critical Items of Equipment, dated 28 February 1945, pertaining to the 46th Bomber Operations Training Wing at Rapid City Army Air Base. CWM items in the report include two HS Vapor Detector Kits, M4; aircraft smoke tanksp; decontaminating apparatus; and four Set, gas, identification, detonating, M1.

National Archives-Rocky Mountain Region
Building 48, Denver Federal Center
Denver, CO 80225
(303) 236-0817

Record Group 121 - Records of the Public Buildings Service
Entry: Construction Management Division, Denver,
Box 34; Subject: Progress Photos and Final Photos, 1915-70, Pierre, SD thru Logan, UT (Folders on Pierre AAF)

Federal Records Center - Denver
Building 48, Denver Federal Center
P.O. Box 25307
Denver, CO 80225
(303) 236-0804

The research team did not find any pertinent information.

National Archives-Central Plains Region
2312 East Bannister Road
Kansas City, MO 64131
(816) 926-6272

The research team did not find any pertinent information.

Federal Records Center-Kansas City
2312 East Bannister Road
Kansas City, MO 64131
(816) 926-7271

The research team reviewed available accessions at this repository and did not find any pertinent information.

Cultural Heritage Center
South Dakota State Historical Society
900 Governors Drive
Pierre, SD 57501-2217
(605) 57501-2217

The research team did not find any pertinent information.

South Dakota State Library
800 Governors Drive
Pierre, SD 57501
(605) 773-3131

The research team conducted an extensive review of card catalog files, vertical files, aerial and ground photograph collections, map collection, and secondary resources and did not find any additional pertinent information.

State Historic Preservation Office (SHPO)
900 Governors Drive
Pierre, SD 57501-2217
(605) 773-3458

The research team conducted a review of files and did not find any additional pertinent information. However, the SHPO did refer the research team to a number of other state organizations for research.

I.D. Weeks Library
University of South Dakota
414 East Clark Street
Vermillion, SD 57069-2390
(605) 677-6088

The research team did not find any pertinent information.

Center for Western Studies
Augustana College
P.O. Box 727
Sioux Falls, SD 57197
(605) 336-4007

After coordination with the archivist at the Center for Western Studies, the Lead Historian sent by fax a letter with an enclosure describing all the team's sites. The research team did not find any pertinent information.

Watertown Regional Library
611 B Avenue, N.E.
Watertown, SD 57201-0250
(605) 882-6226

The research team consulted with the Chief Librarian and conducted a research of their special collections on the military in South Dakota. The research team did not find any pertinent information.

Timber Lake and Area Historical Society
P.O. Box 181
Timber Lake, SD 57656-0181
(605) 865-3787

The research team received information on the annexation of Armstrong County by Dewey County, SD. Members of the Timber Lake and Area Historical Society, also provided referrals for interviews.

Timber Lake Topic (Newspaper)
P.O. Box 10
Timber Lake, SD 57656-0010
(605) 865-3546

The research team inquired as to historical information available. The research team did not receive any pertinent information. However, the Editor of the Timber Lake Topic provided us referrals for interviews.

Dewey County Library
P.O. 68
Timber Lake, SD 57656
(605) 865-3541

The research team did not find any additional pertinent information.

Environmental Protection Department
Cheyenne River Sioux Tribe
P.O. Box 590
Eagle Butte, SD 57625
(605) 964-6559

The research team received copies of historical documents pertaining to the acquisition, Army Air Corps training, disposal and decontamination of the Armstrong Air-to-Air Gunnery Range. The Environmental Protection Department, Cheyenne River Sioux Tribe, previously retrieved their historical documentation from the National Archives and Records Administration.

4.3 Summary of Interviews

Interviews were conducted by telephone and in person, both prior to and during the site inspection. The primary purpose of these interviews was to make initial contact with individuals knowledgeable of the site and to coordinate follow-up visits during the site inspection phase of this ASR's preparation. A list of persons interviewed is included at Appendix H. Any pertinent information derived from these discussions is covered within the context of this report.

4.3.1 Interview with Environmental Director

David Nelson is the Environmental Director for the Environmental Protection Department, Cheyenne River Sioux Tribe. The St. Louis team questioned him about the origins of the 20mm practice projectile which is displayed in the Eagle Butte Environmental Office. Mr. Nelson said that a man brought the 20mm to the office in 1993 or 1994. The man said his nephew had found it when he was riding one day. Me. Nelson said the man left before he was able to get his name and no one in the office recognized him. Mr. Nelson has been unable to locate him since them. The only thing he is sure of is that the 20mm was found on tribal land, and it is the only one his office is aware of.

4.4 Air Photo Interpretation and Map Analysis

4.4.1 Interpretation of Aerial Photography

Photoanalysis and land use interpretation were done using the following listed photography:

Photography Date	Scale	Source	Identifier(s) Frame(s)
24 Oct 1950	1"=5280'	ASCS	BNT 1G 17 thru 52; 100 thru 117; 129 thru 181; 2G 28 thru 157

The maps cited at paragraph 4.4.2 (below) were used as references for the photography.

Photography listed above covering the Armstrong County Air-to-Air Gunnery Range was examined. A lack of features pertaining to military use is attributed to the fact that this was an air-to-air range. No targets or boundary markers were observed. Disturbances of the soil due to military activities were not visible.

Terrain at the site is hilly, with relief varying up to 200' locally. The Missouri River is the major drainage feature in the area. Small rivers, streams and creeks drain dendritically into the Missouri. Lake Ohae, forming part of the southern boundary of the study area, was formed by damming the Missouri River. Land use in the study area is mostly agriculture -- specifically grazing. Primary hard-surface roads form the backbone of an infrastructure which is comprised mainly of secondary hard-surface and unpaved roads. A rail line cuts through the northern end of the study area. The area is largely unpopulated; the territory belongs to the Cheyenne River Indian Reservation.

4.4.2 Map Analysis

The site was analyzed using the following maps:

(1) USGS 1:250,000 quadrangle maps:
McINTOSH, S. Dakota (1953), revised 1976
PIERRE, S. Dakota (1954), revised 1976

(2) War Dept. Real Estate Map:
Armstrong County Air to Air Gunnery Range (Feb, 1948)

Review of the above-cited map sheets confirms general descriptions found in paragraph 4.4.1 above. The maps were also useful in locating boundaries and identifying features on the photography.

5.0 Real Estate

5.1 Confirmed DoD Ownership

The War Department acquired the site, consisting of 404,439.41 acres, by use permit from the Department of Agriculture (7,992.98 acres), though Public Land Order No. 147 from the Department of Interior (80 acres), and by leases (396,366.43 acres) in 1943. The site was declared surplus in 1947 and returned to original owners.

5.2 Potential DoD Ownership

No information indicating DoD ownership of any related lands other than those mentioned above was uncovered during the archive search.

5.3 Significant Past Ownership

There was no significant past ownership, other than DoD, that would have contributed to OE contamination.

5.4 Present Ownership

The majority of the site is owned by the Department of Interior, Bureau of Indian Affairs and the Cheyenne River Sioux Tribe, with a few private individuals owning deeded properties. Most of this land is used for grazing with some farming operations. The southeastern portion of the site, known as the Little Bend Area in Sully County, is owned by the Corps of Engineers.

6.0 Site Inspection

The site inspection was conducted on 6 August 1996, by the following personnel of the St. Louis District:

Dennis W. Gilmore	Project Manager
Gregg Kocher	Safety Specialist
M. Kevin McCaffrey	QASAS

The site survey confirmed the presence of OE debris within the FUDS.

This former World War II air-to-air gunnery range covers all of southern Dewey County south of State Highway 212. The 404,439.41 acre site formerly encompassed all of the now defunct Armstrong County and is within the Cheyenne River Indian Reservation. The terrain is varied with vegetation consisting primarily of grasses.

The southern portion of the site has been inundated, to an elevation of 1630 feet, by the development of Lake Oahe. This includes a portion of the former range commonly known as Little Sully Point which records indicate may have been used as an air-to-ground range, possibly complete with on-ground targets. Based on real estate information, this was part of the Armstrong acquisition.

Due to the vastness of the site and lack of historical information identifying areas of potential contamination, the site inspection focused on areas identified by Mr. Dugan Smith, Program Manager of the Tribe's Environmental Protection Department.

The team met with Dugan Smith at the reservation's environmental office. The Tribe has commissioned an environmental study which includes an assessment of OE contamination. Their efforts have resulted in several items of OE being recovered. The majority of these items are expended .50 caliber casings and points. Other items include at least one 20mm round, musket balls, and a .45-70 bullet. Specific locations where these items were recovered is not known. A large portion of the recovered items are turned in to the environmental office by individuals who happen across them.

No concentration of OE was found as would be expected based on the utilization of the range. Expended .50 caliber rounds can be, and have been, recovered throughout the site and beyond. Most of the recently recovered items have been located inches below the ground surface.

Photographs of the site are located in Appendix I.

7.0 Evaluation of Ordnance Presence

Based on the extensive archive searches performed, the interviews with the owners and/or managers of this DERP-FUDS site, and observations made during the conduct of the site inspection, this site is known to contain OE, mainly small arms.

As stated in Section 6.0 - Site Inspection, various items of OE, reportedly recovered on the site, were observed. The small arms were generally covered by several inches of soil. Most of the recent finds have occurred after heavy rains. None of the observed items presented an explosive hazard.

The origin of the single 20mm round previously recovered remains unknown. According to Mr. Dave Nelson, of the Tribe's environmental office, the 20mm round was left on his desk, in 1993, by a man who said that his nephew had found it while out riding. He believes it was recovered on tribal lands, but cannot confirm the location, as he has been unsuccessful in locating the individual who left the item on his desk. No other 20mm rounds have been found.

There is some question as to the .45-70 origins based on its condition and appearance which show no signs of deterioration. Had it been exposed to the ground and/or elements for a hundred years, some deterioration should be noted. Circumstances surrounding this recovery, as well as that of the musket balls, are also unknown. In any event, they would not pose any additional OE related risks.

8.0 Technical Data of Ordnance and Explosives

The ordnance used on the air-to-air gunnery range during World War II was apparently limited to .50 caliber machine gun ammunition. However, one 20mm expended round was reportedly recovered on the site, therefore a data sheet is included for informational purposes. A .47-70 cartridge was also discovered on the site. The cartridge was used by the U.S. active military from 1873 to 1892 in the Springfield rifle. Various state National Guard units, as well as civilian hunters, continued to use the cartridge well after 1892. A data sheet has been included for the .45-70 cartridge. Data sheets for the listed ordnance are located in Appendix C.

Cartridge, Armor Piercing, Caliber .50 Caliber, M2

Cartridge, 20 MM, H.E.-I, MK. I

Cartridge, Caliber .45-70

9.0 Evaluation of Other Site Information

No other environmental concerns relevant to DoD were discovered during the research or site visit.

APPENDIX A

REFERENCES

ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
ARCHIVES SEARCH REPORT
FINDINGS
ARMSTRONG COUNTY AIR-TO-AIR GUNNERY RANGE
Dewey and Sully Counties, South Dakota

Project Number B08SD081901

APPENDIX A -- REFERENCES

A.1 INPR Reference

U. S. Army Corps of Engineers
1994 Inventory Project Report, Armstrong County Air-to-Air Gunnery Range, Dewey and Sully Counties, South Dakota. Omha District, Corps of Engineers, Omha, NE.

A.2 General References

Army Air Corps
1946a 3rd Indorsement, dated 12 August 1946, signed by LTC Glen G. Heavenridge, Commanding Officer, Fairmont Army Air Field, NE, to Basic Letter, CO, Fairmont AAF, to CG, 15 AF, 16 July 1946, Subject: "Release of Pierre Air to Air Gunnery Range." Historical Files, Environmental Protection Department, DOD/ANA, Mitigation Project. Eagle Butte, SD.

Army Air Corps
1946b 10th Indorsement, dated 19 November 1946, signed by Captain H. Gundlach, Adjutant, Headquarters, Grand Island Army Air Field, NE, to Basic Letter, from Fairmont Army Air Field, Geneva, Ne, Subject: Release of Pierre Air Gunnery Range, dated 16 July 1946. Historical Files, Environmental Protection Department, DOD/ANA, Mitigation Project. Eagle Butte, SD.

Army Service Forces
1948 Engineer Form 1019, Realty Control File Summary, dated 11 February 1948, Reservation Name: Armstrong County Air to Air Gunnery Range, SD. Historical Files, Environmental Protection Department, DOD/ANA, Mitigation Project. Eagle Butte, SD.

Corps of Engineers
1947a Military Certificate of Clearance, dated 5 September 1947, signed by Captain Asa B. Luter, CE, 9800 TSU-CE, DET 6, Bomb & Shell Disposal Team, regarding Western Sully County Bombing Range (also known as the Little Bend Area Sully County Bombing Range). Historical Files, Environmental Protection Department, DOD/ANA, Mitigation Project. Eagle Butte, SD.

Corps of Engineers
1947b Military Memorandum, from the Commanding Officer, Headquarters, Detachment 6, 9800 TSU-CE, Bomb & Shell Disposal Team, Pierre, SD, to Office of Division Engineer, MRD, Omaha, NE, dated 5 September 1947, Subject: Clearance Report of Armstrong Aerial Gunnery Range, SD. Historical Files, Environmental Protection Department, DOD/ANA, Mitigation Project. Eagle Butte, SD.

Corps of Engineers
1947c Military Certificate of Clearance, dated 5 September 1947, signed by Captain Asa B. Luter, CE, 9800 TSU-CE, DET 6, Bomb & Shell Disposal Team, regarding Armstrong Aerial Gunnery Range and the Western Sully County Bombing Range (also known as the Little Bend Area Sully County Bombing Range). Historical Files, Environmental Protection Department, DOD/ANA, Mitigation Project. Eagle Butte, SD.

Corps of Engineers
1949 Real Property Management and Disposal Report, dated 15 May 1949, from Administration Officer, Division Office, Omaha, NE, to the Chief of Engineers, Washington, D.C. Historical Files, Environmental Protection Department, DOD/ANA, Mitigation Project. Eagle Butte, SD.

A.3 References for Geology and Soils

Fenneman, Nevin M.
1931 *Physiography of Western United States*. McGraw-Hill Book Company, New York.

Kalvels, John and Paul M. Boden
1979 *Soil Survey of Dewey County, South Dakota*. US Department of Agriculture, Soil Conservation Service, in cooperation with the South Dakota Agricultural Experiment Station.

Morgan, Ray E. and Bruno C. Petsch
1945 *A Geological Survey in Dewey and Corson Counties, South Dakota*. Report of Investigations No. 49. South Dakota State Geological Survey.

Rothrock, E.P. and T.W. Robinson, Jr.
1938 *Artesian Conditions in West Central South Dakota*. Report of Investigations No. 26. South Dakota State Geological Survey.

United States Geological Survey.
1964 *Mineral and Water Resources of South Dakota*. U.S. Government Printing Office, Washington.

A.4 Demographic References

U.S. Census report as listed below:

-1988 County and City Data Book, Land Area and Population, Dewey County, SD.
-1988 County and City Data Book, Land Area and Population, Eagle Butte, SD.
-1990 Census of Population and Housing, Dewey County, SD.
-1990 Census of Population and Housing Eagle Butte, SD.
-1991 County Business Patterns, Dewey County, SD.

APPENDIX B

GLOSSARY AND ACRONYMS

ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
ARCHIVES SEARCH REPORT
FINDINGS
ARMSTRONG COUNTY AIR-TO-AIR GUNNERY RANGE
Dewey and Sully Counties, South Dakota

Project Number B08SD081901

APPENDIX B -- GLOSSARY AND ACRONYMS

AA	Anti-Aircraft
AAB	Army Air Base
AAF	Army Air Field
AD	Artillery District
AFB	Air Force Base
AGO	Adjutant General's Office
ANA	Administration for Native Americans
AP	Armor Piercing
APDS	Armor Piercing Discarding Sabot
APERS	Antipersonnel
APT	Armor Piercing with Tracer
ASR	Archives Search Report
ATG	Air-to-Ground
Aux	Auxiliary
BAR	Browning Automatic Rifle
BD	Base Detonating
BD/DR	Building Demolition/Debris Removal
BE	Base Ejection
BGR	Bombing and Gunnery Range
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BRAC	Base Realignment And Closure
CAC	Coast Artillery Corps
CADD	Computer-Aided Design/Drafting
Cal	Caliber
CBDA	Chemical and Biological Defense Agency
CBDCOM	Chemical and Biological Defense Command
CE	Corps of Engineers
CEHND	Corps of Engineers, Huntsville Division
CELMS	Corps of Engineers, St. Louis
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESWA	Corps of Engineers, Albuquerque
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second
CG	Commanding General
CO	Commanding Officer
COC	Certificate of Clearance

COE	Chief of Engineers
COMP	Composition
CTG	Cartridge
CRF	Coincidence Range Finder
CSM	Chemical Surety Material
CSM	Command Sergeant Major
CWM	Chemical Warfare Material
CWO	Chief Warrant Officer
CWS	Chemical Warfare Service
DA	Department of the Army
DARCOM	Development and Readiness Command
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DERP-FUDS	Defense Environmental Restoration Program-Formerly Used Defense Sites
DET	Detachment
DGFP	Department of Game Fish and Parks (South Dakota)
DoD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
EE/CA	Engineering Evaluation/Cost Analysis
EIS	Environmental Impact Statement
EOD	Explosives Ordnance Disposal
EPA	Environmental Protection Agency
ERDA	Environmental Restoration Defense Account
ERTC	Engineer Replacement Training Center
FDE	Findings and Determination of Eligibility
FFMC	Federal Farm Mortgage Corporation
FLCH	Flechette
FS	Feasibility Study
FUDS	Formerly Used Defense Sites
GIS	Graphic Information System
gpm	Gallons per Minute
GSA	General Services Administration
HE	High Explosive
HEAT	High Explosive Anti-Tank
HEI	High Explosive Incendiary
HEP	Plastic
HE-S	Illuminating
HTRW	Hazardous Toxic and Radioactive Waste
HTW	Hazardous and Toxic Waste
HQ	Headquarters
IAS	Initial Assessment Study
INPR	Inventory Project Report
IRP	Installation Restoration Program
MCX	Mandatory Center of Expertise
MG	Machine Gun
MG	Major General
mm	Millimeter
MRD	Missouri River Division
MT	Mechanical Time
MTSQ	Mechanical Time Super Quick
NARA	National Archives and Records Administration

NAS	Naval Air Station
NCDC	National Climatic Data Center
NCP	National Contingency Plan
NFS	National Forest Service
NG	National Guard
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NOFA	No Further Action
NPRC	National Personnel Records Center
NRC	National Records Center
OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Act
OTU	Operational Training Unit
PA	Preliminary Assessment
PBR	Precision Bombing Range
PD	Point Detonating
PIBD	Point Initiating, Base Detonating
PL	Public Law
QASAS	Quality Assurance Specialist Ammunition Surveillance
RA	Removal Action
RAC	Risk Assessment Code
RD	Remedial Design
RG	Record Group
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SDGF&P	South Dakota Department of Game, Fish and Parks
SLD	St. Louis District, Corps of Engineers
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SWMU	Solid Waste Management Units
TECOM	Test Evaluation Command
TEU	Technical Escort Unit
TNT	Trinitrotoluene
TP	Target Practice
TSU	Technical Service Unit
USA	United States of America
USACE	U.S. Army Corps of Engineers
USADACS	U.S. Army Defense Ammunition Center and School
USAED	U.S. Army Engineer District
USAEDH	U.S. Army Engineer Division, Huntsville, AL
USAF	United States Air Force
USATHMA	U.S. Army, Corps of Engineers, Toxic and Hazardous Materials Agency
USC	United States Code
USDA	U.S. Department of Army
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
WAA	War Assets Administration
WD	War Department
WNRC	Washington National Records Center

APPENDIX C

TEXT / MANUALS

ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
ARCHIVES SEARCH REPORT
FINDINGS
ARMSTRONG COUNTY AIR-TO-AIR GUNNERY RANGE
Dewey and Sully Counties, South Dakota

Project Number B08SD081901

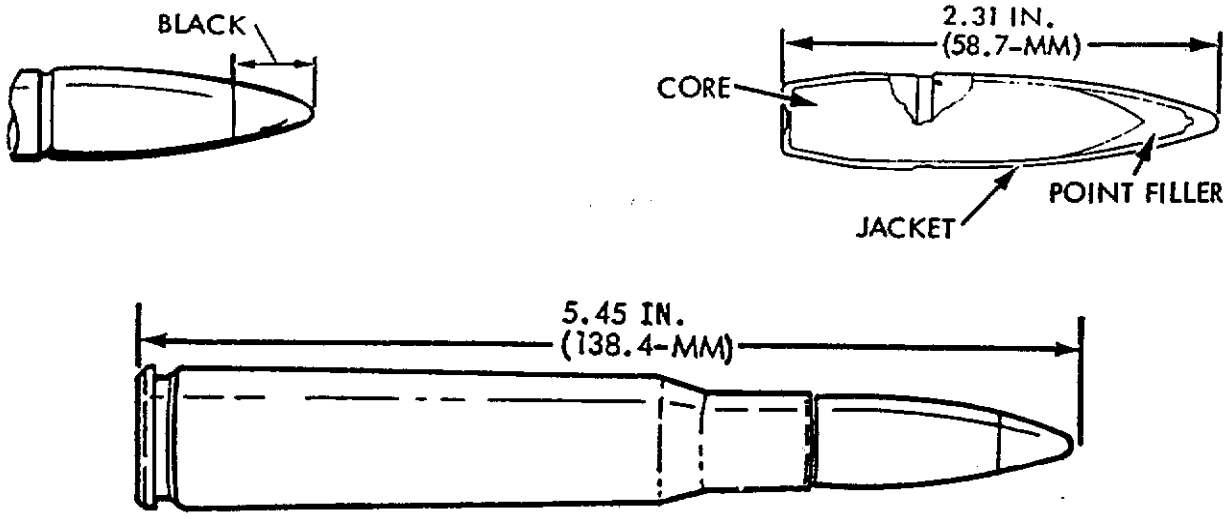
APPENDIX C -- TEXT/MANUALS

C-1 Cartridge, Armor Piercing, Caliber .50 Caliber, M2

C-2 Cartridge, 20 MM, H.E.-I, MK. I

C-3 Cartridge, Caliber .45-70

CARTRIDGE, ARMOR PIERCING, CALIBER .50, M2

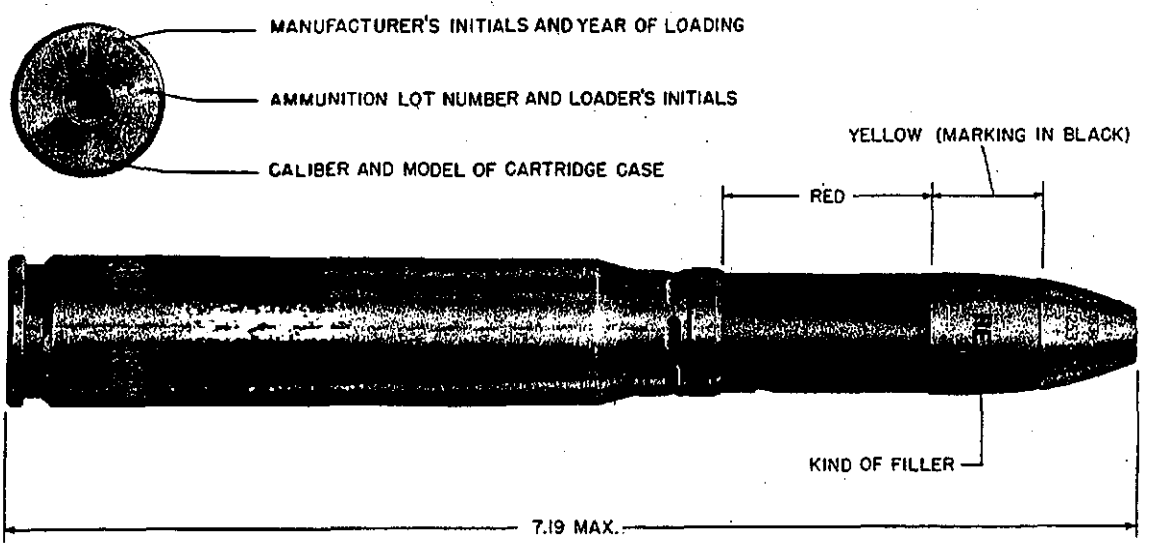


Description: The armor piercing cartridge was standard issue for all .50 caliber machine guns during World War II. It is designed for use against armored aircraft, armored vehicles, concrete shelters, and similar targets. The cartridge is identified by the blackened tip of the bullet. It consists of a cartridge case, primer, propelling charge, and bullet. The bullet has a tungsten-chrome steel core with a point filler of lead encased inside a gilding metal jacket. The bullet can hit within 8 inches of a target at 500 yards and within 9 inches at 600 yards. The maximum range is 7200 yards.

Length ..... 5.45 inches
Weight ..... 1812 grains
Propellant ..... WC 860
Propellant Weight ..... 235 grains
Primer ..... Percussion

Reference ..... TM 43-0001-27, Jun 81
TM 9-1904, Mar 44

CARTRIDGE, 20 MM, H.E.-I, MK. I

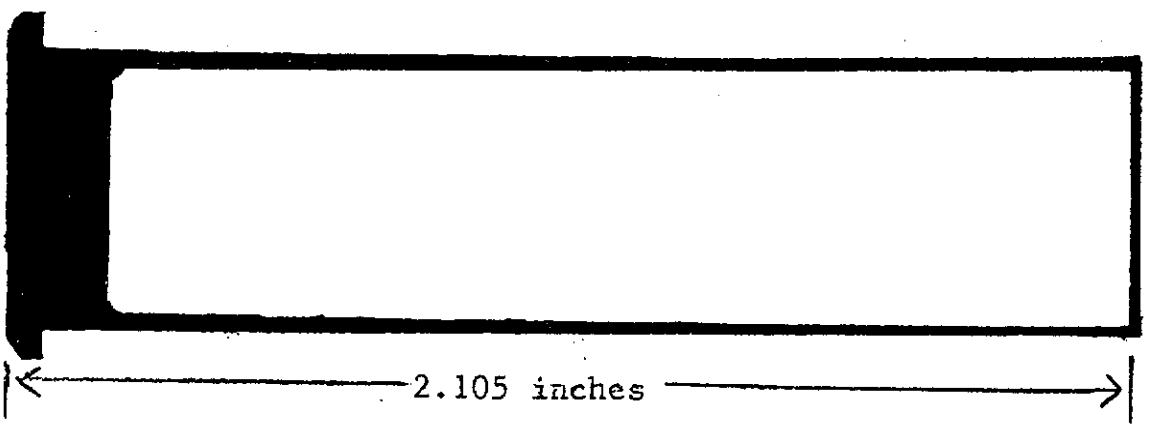


Description: The Mk. I Cartridge was adopted from the British in 1941 and used in the M1, AN-M2, and Hispano guns. While it is fired from aircraft guns against other aircraft, it can also be directed against light ground targets and personnel. The complete round consists of a cartridge case, primer, propellant, and the projectile with its fuze and high explosive, incendiary charge. The M36 Percussion Primer is standard in the M21A1 and M21A1B1 cartridges cases, while the M37 Berdan type primer is used in the M21 cartridge case. The M21A1 is made of brass, while the M21A1 and M21 are made of steel. The flashless and nonhygroscopic powder (FNH) is poured loosely into the cartridge case. The projectile is made of cold-drawn steel and has a high explosive incendiary filler.

Length	7.19 inches
Weight	0.57 pounds
Fuze	Percussion, D.A. No. 253, Mk. I /A/
Cartridge Case	M21, M21A1, or M21A1B1
Primer	M37 or M36
Propelling Charge	0.07 pounds FNH Powder, Type II
Painting and Markings	Yellow & red w/black markings

Reference ..... TM 9-1904, Mar 44

CARTRIDGE, CALIBER, .45-70



Description: The .45-70 cartridge was used by the active duty troops from roughly 1873 to 1892 in the Springfield rifle. National Guard units continued to use the round after the round was replaced by the Krag cartridge. Volunteer units even used the cartridge during the Spanish-American War. The .45-70 also remained popular with hunters many years after even the various National Guard units stopped using it. It is best used against short range targets.

Length of Cartridge Case: .....2.105 inches
Head Width: .....0.608 inches
Mouth Width: .....0.480 inches

APPENDIX D

REPORTS / STUDIES

ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
ARCHIVES SEARCH REPORT
FINDINGS
Armstrong County Air-to-Air Gunnery Range
Dewey and Sully Counties, South Dakota

Project Number B08SD081901

APPENDIX D – REPORTS/STUDIES

D-1 Inventory Project Report, Armstrong County Air-to-Air Gunnery Range, 1994. U. S. Army Corps of Engineers, Omaha, NE.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, MISSOURI RIVER DIVISION
12565 WEST CENTER ROAD
OMAHA, NEBRASKA 68144-3869

REPLY TO
ATTENTION OF

CEMRD-MP-H (200-1c)

25 APR 1994

MEMORANDUM FOR Commander, Omaha District, ATTN: CEMRO-MD-H

SUBJECT: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) - Armstrong County Air to Air Gunnery Range, Dewey County, South Dakota, Site No. B08SD081900, Project No. B08SD081901 (OEW)

1. Reference memorandum, CEMP-RF, 28 March 1994, subject as above (copy enclosed).

2. The referenced project approval as an OEW project is furnished for your information and action. The next phase of the project will be an EE/CA. Request you:

a. Notify the landowners of the decision and provide copies of notification to CEMP-RF and CEHND-PM-OT.

b. Update the DERP-FUDS database.

c. Assign a Project Manager per ER 5-7-1 and Huntsville Division will add the project to the FY 95 OEW Workplan.

d. Coordinate with Huntsville Division on any supervision and administration funds needed in the Omaha District Workplan.

3. If you have any questions, please contact Joe Laird, (402) 221-7459.

FOR THE COMMANDER:

GARY M. ERICKSON, P.E.
Director, HTRW and Military
Programs Management

Encl
as

CF:
CEHND-PM-ED OT

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

28 MAR 1994

REPLY TO
ATTENTION OF:

CEMP-RF (200-1a)

MEMORANDUM FOR

COMMANDER, MISSOURI RIVER DIVISION, ATTN: CEMRD-ED-HP (J. Laird)
COMMANDER, HUNTSVILLE DIVISION, ATTN: CEHND-ED-SY (R. Britton)

SUBJECT: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) - Armstrong County Air to Air Gunnery Range, Dewey County, South Dakota, Site No. B08SD081900, Project No. B08SD081901(OEW).

1. Reference

a. CEHND-ED-SY memorandum, 17 December 93, DERP-FUDS Inventory Project Report (INPR), 27 July 1993, for subject site.

b. Engineer Regulation, ER 5-7-1(FR), 30 Sep 92, Subject: Project Management.

c. Memorandum, CEMP-RF, 16 Nov 92, Subject: Implementation of Project Management for the DERP-FUDS.

d. Memorandum, CEHND-ED-SY, 9 September 93, Subject: DERP-FUDS INPRs Requiring an OEW Engineering Evaluation/Cost Analysis (EE/CA).

2. This memorandum authorizes an Ordnance and Explosive Waste (OEW) project at the subject site. The first phase of this project will be an EE/CA as recommended in reference 1a.

3. Overall Project Management (PM) for this site is the responsibility of Omaha District. Huntsville Division will assign a Technical Manager for the execution of the subject OEW project through Removal Design, as appropriate and provide technical support for all phases. If required, CEMRO will execute any Removal Action.

4. We request:

a. CEMRO, within sixty days of the date of this memorandum, ensure the landowners are notified of the decision and provide copies of the notification letter to CEMP-RF and CEHND-PM-OT.

b. CEMRO ensure that the project is programmed in the appropriate DERP-FUDS fiscal year workplan and the five-year workplan. All contracts should be awarded before the end of the third quarter of any fiscal year.

CEMP-RF (200-1a)
SUBJECT: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) - Armstrong County Air to Air Gunnery Range, Dewey County, South Dakota, Site No. B08SD081900, Project No. B08SD081901(OEW).

c. CEMRO will update the DERP-FUDS database at the Corps of Engineers Waterways Experiment Station. CEMRD will periodically screen this database to ensure that the required update has been completed.

5. CEMP-RF POC for this action is Ms. Gail Braten, (202) 504-4426.

FOR THE DIRECTOR OF MILITARY PROGRAMS:

for Patrick A. Lin CTR Deputy
Cary Jones
Chief, Environmental Restoration Division
Directorate of Military Programs

CF:
CDR: Omaha District Corps of Engineers, ATTN: CEMRO-ED-EC

CEMRO-ED-EC (200-1c)

MEMORANDUM FOR Commander, Missouri River Division, ATTN: CEMRD-ED
(*Joe Grasso*)

SUBJECT: DERP-FUDS Inventory Project Report for Site Number BO8SD081900, Armstrong County Air to Air Gunnery Range, South Dakota

1. This Inventory Project Report (INPR) documents the DERP-FUDS preliminary assessment of the Armstrong County Air to Air Gunnery Range. A site visit was conducted on 22 February 1993. The Site Survey Summary Sheet, site map, and real estate documents are at enclosure 1.

2. We determined that the site was formerly used by the Department of Defense. A recommended Findings and Determination of Eligibility is at enclosure 2.

3. We also determined there may be hazardous waste at the site eligible for cleanup under DERP-FUDS. The category of hazardous waste at the site is OEW. A Project Summary Sheet and Risk Assessment Code (RAC) for a potential OEW project are at enclosure 3.

4. I *recommend* that you:

a. Approve and sign the Findings and Determination of Eligibility; and,

b. Forward a copy of this INPR to CEHND for the PA file and for a determination of the need for further investigation for the OEW project.

3 Encls (trip)

STEWART H. BORNHOFT
Colonel, Corps of Engineers
Commanding

WAGNER/sm/7643

CF:
CEMRO-RE-PR (Perrigo)
CEMRO-MD-HA (Fernley)

LITTLE/CEMRO-ED-EC

SMART/CEMRO-ED-E

CARLOCK/CEMRO-ED-E

PLACK/CEMRO-MD-H

KELL/CEMRO-ED

HENNINGSON/CEMRO-OC

ROUMPH/CEMRO-DC

RUDLOFF/CEMRO-EX

COL BORNHOFT/CEMRO-DE

SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. B08SD081900
ARMSTRONG COUNTY AIR TO AIR GUNNERY RANGE
DEWEY AND SULLY COUNTIES, SOUTH DAKOTA
JULY 1993

SITE NAME: Armstrong County Air to Air Gunnery Range, also known as Pierre Air to Air Gunnery Range.

LOCATION: Six miles east of Eagle Butte, Dewey County, South Dakota; see site map attached.

SITE HISTORY: In 1943, the United States Government acquired a total of 404,439.41 acres of land for the Armstrong County Air to Air Gunnery Range. The acquisition consisted of 7,992.98 use-permit acres by transfer from the Department of Agriculture, 80.00 acres by Public Land Order No. 147 from the Department of Interior, and leases for 396,366.43 acres. The site was acquired by the War Department for use as an air to air gunnery range in support of the Pierre Army Airfield, Pierre, South Dakota; Fairmont Army Airfield, Fairmont, Nebraska; Harvard Army Airfield, Harvard, Nebraska; and, Bruning Army Airfield, Bruning, Nebraska. No improvements were constructed on the site, except for flight boundary markers. On 31 August 1947, the site was declared surplus. The 7,992.98 use-permit acres were relinquished to the Department of Agriculture, and the 80.00 public domain acres were relinquished to the Department of Interior. Transfer letters state that the area had been cleared of all explosives and explosive objects. The letters also state that no restoration was deemed necessary since the only improvements placed on the land were flight boundary markers. The leases covering 396,366.43 acres were cancelled between 20 November and 17 December 1947.

The majority of the 396,366.43 lease acreage is owned by the Department of Interior, Bureau of Indian Affairs and the Cheyenne River Sioux Tribe, with a few private individuals owning deeded properties. Most of this land is used for grazing; however, there are also some small farming operations. Properties acquired from the Department of Interior (80.00 acres by Public Order #147) and the Department of Agriculture (7,992.98 use-permit acres) as well as some of the lease acreages are currently owned by the Department of the Army, Corps of Engineers as part of the Lake Oahe Main Stem Reservoir project.

SITE VISIT: Mr. Kent Dixon and Ms. Deanna Pulse of EA Engineering, Science, and Technology, Inc. conducted a site visit of the former Armstrong County Air to Air Gunnery Range on 22 February 1993.

CATEGORY OF HAZARD: OEW.

PROJECT DESCRIPTION:

a. BD/DR. No further action. During the period of Department of Defense (DOD) control, improvements installed by DOD included a few boundary markers. Local residents living in the area at the time stated that the corner markers consisted of two wooden structures connected at 90° angles, measuring approximately 100 feet long and 30 feet high. The surface was painted bright orange so as to be easily recognized by the pilots. These structures have been dismantled by the landowners, and the lumber has been used to build and repair farm sheds. Current landowners reported finding an occasional target and connecting cables that had been shot from the planes; however, the wire mesh holding the targets has rusted and disintegrated over the years, and all that remain are connecting cables and support structures. Current DOD policy does not authorize removal of debris from privately owned sites nor do the transfer documents obligate the Government to restore the site. There is no evidence of debris or unsafe structures resulting from DOD use of the site.

b. CON/HTW. No further action. Historical records indicate that neither underground nor aboveground fuel storage facilities nor transformers were installed on the site. No evidence of containerized waste was noted in conversations with the current landowners or during the site visit.

c. HTW. No further action. Records do not indicate that any hazardous or toxic waste facilities were constructed on the site. No evidence of waste disposal areas were noted in the real estate records, maps, or during the site visit.

d. OEW. Available records indicate the site was used as an air to air gunnery range. Private citizens have reported finding empty casings, points, and occasionally live ammunition throughout the site. Further investigation beyond the scope of this PA is proposed for CEHND.

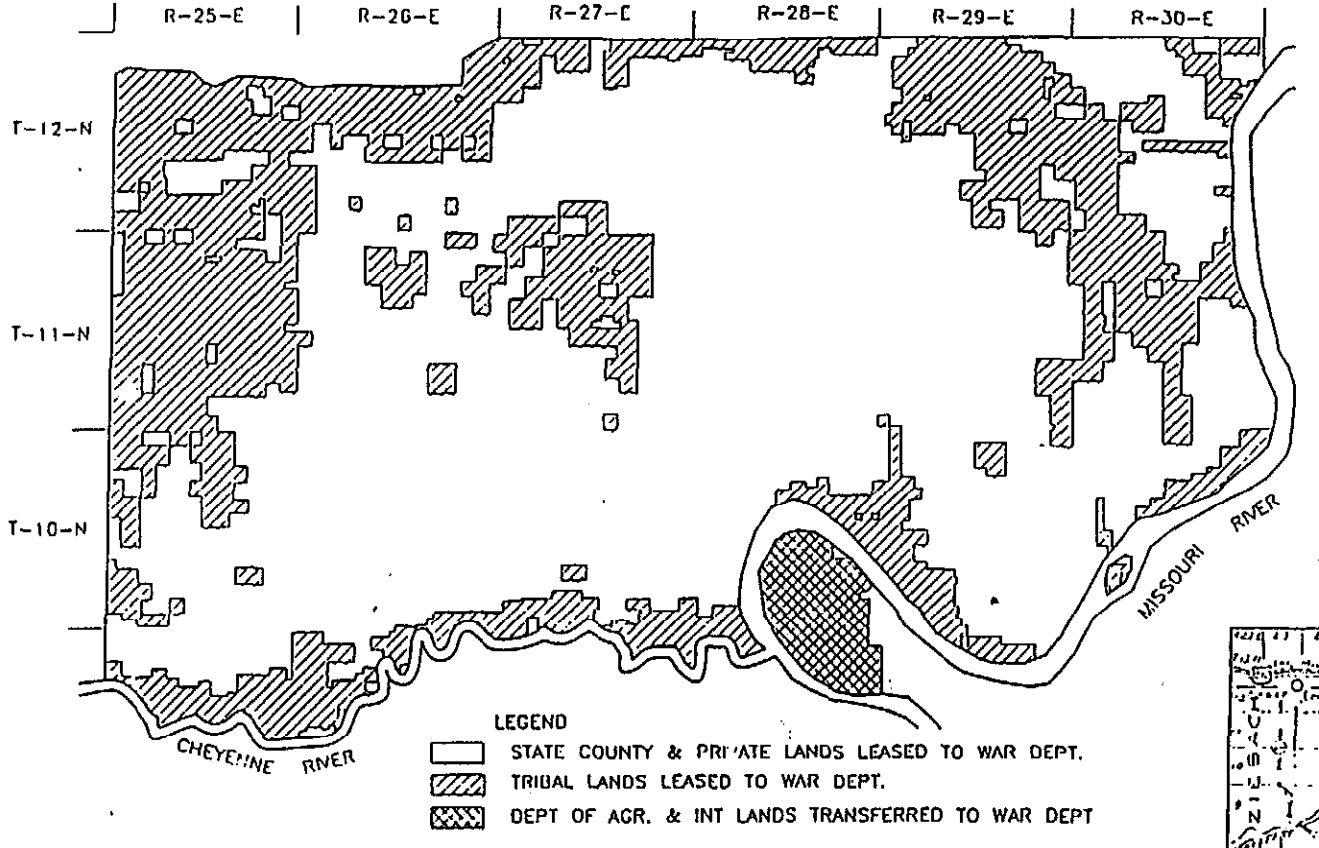
AVAILABLE STUDIES AND REPORTS: Omaha District, Real Estate Audit Files.

PA POC: Linda Wagner or Bruce K. Little, CEMRO-ED-EC, (402) 221-7643.

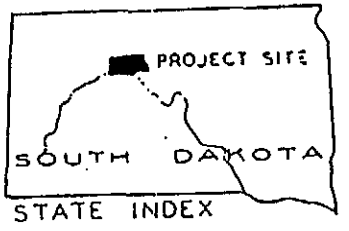
SITE MAP

SITE NAME: ARMSTRONG COUNTY AIR TO AIR GUNNERY RANGE

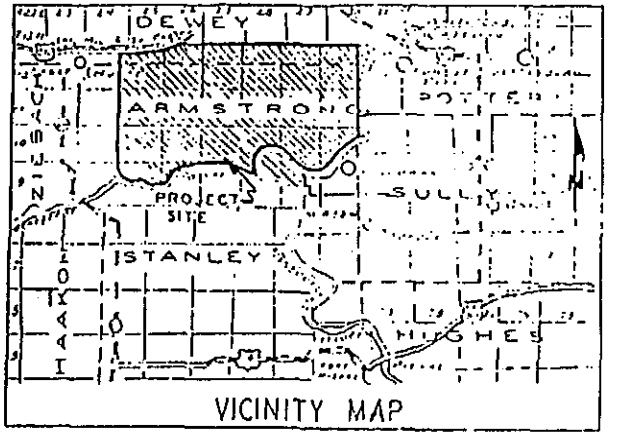
SITE NUMBER: BO8SD081900



NOT TO SCALE



STATE INDEX



VICINITY MAP

0 6 12 18 24 30 36

SCALE IN MILES

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FORMERLY USED DEFENSE SITES PROGRAM
FINDINGS AND DETERMINATION OF ELIGIBILITY
ARMSTRONG COUNTY AIR TO AIR GUNNERY RANGE
DEWEY AND SULLY COUNTIES, SOUTH DAKOTA
SITE NO. BO8SD081900

FINDINGS OF FACT

1. Between 1943 and 1947, the United States Government acquired a total of 404,439.41 acres of land for the Armstrong County Air to Air Gunnery Range. The acquisition of the range consisted of 7,992.98 use permit acres by transfer from the Department of Agriculture on 15 April 1943; 80.00 acres of public domain land transferred from the Department of Interior by Public Land Order No. 147 dated 12 July 1943; and 396,366.43 acres lease from private individuals.

2. This site was acquired by the War Department to be utilized as an air to air gunnery range in support of Pierre Army Air Field, Pierre, South Dakota; Fairmont Army Air Field, Fairmont, Nebraska; Harvard Army Air Field, Harvard, Nebraska; and Bruning Army Air Field, Bruning, Nebraska. The site was also referred to as the Pierre Air to Air Gunnery Range. No improvements were constructed on the site, except for a few flight boundary markers. The property was under the Department of Defense (DOD) control during the entire period of DOD ownership.

3. On 31 August 1947, this installation was declared surplus to the needs of the Government. By letter, dated 12 March 1948, the 7,992.98 acres of use permit were relinquished to the Department of Agriculture. By letter, dated 12 March 1948, the 80.00 acres of public domain were relinquished to the Department of Interior and Public Land Order No. 147 was revoked by Public Land Order No. 531 on 24 November 1948. The transfer letters stated that the area had been cleared of all explosives and explosive objects. The letters also stated that no restoration was deemed necessary since the only facilities or improvements placed on the land were a few flight boundary markers. All leases were cancelled between 20 November and 17 December 1947. Portions of this property are currently being utilized by the Department of the Army, U.S. Army Corps of Engineers for the Oahe Dam/Lake Oahe Project.

DETERMINATION

Based on the foregoing findings of fact, the site has been determined to be formerly used by the Department of Defense. However, the property utilized as the Oahe Dam - Lake Oahe is the responsibility of the Department of the Army, Corps of Engineers. The remaining properties are eligible for the Defense Environmental Restoration Program for Formerly Used Defense Sites, established under 10 U.S.C. 2701, et seq.

DATE

JOHN E. SCHAUFELBERGER
Colonel, EN
Commanding

PROJECT SUMMARY SHEET
FOR
DERP-FUDS OEW PROJECT NO. B08SD081901
ARMSTRONG COUNTY AIR TO AIR GUNNERY RANGE
DEWEY AND SULLY COUNTIES, SOUTH DAKOTA
SITE NO. B08SD081900
JULY 1993

PROJECT DESCRIPTION: In 1943, the United States Government acquired a total of 404,439.41 acres of land for the Armstrong County Air to Air Gunnery Range. The site was acquired by the War Department for use as an air to air gunnery range in support of the Pierre Army Airfield, Pierre, South Dakota; Fairmont Army Airfield, Fairmont, Nebraska; Harvard Army Airfield, Harvard, Nebraska; and Bruning Army Airfield, Bruning, Nebraska. Landowners reported that DOD personnel conducted aerial target practice with fighter planes shooting at targets towed behind other planes. Landowners reported finding bullets, casings and occasionally live ammunition, but nothing larger than .50-caliber ammunition. During farming activities, landowners also reported finding casings north of the site where planes strayed from the facility boundary. In recent years, ammunition has been found infrequently during farming operations. No evidence of ordnance was observed during the February 1993 site visit, except for some .50-caliber points and casings collected by one of the landowners.

Transfer letters were issued to the Department of Interior upon withdrawal of Public Land Order No. 147 for 80.00 acres and to the Department of Agriculture upon relinquishing 7,992.98 use-permit acres stating that these areas had been cleared of all explosives and explosive objects. There is no record of a clearance letter issued regarding the remaining 396,366.43 acres.

PROJECT ELIGIBILITY: The site has been determined to have been formerly used by DOD. Investigation of existing and potential OEW-related contamination associated with former DOD use of the site is eligible under DERP-FUDS.

POLICY CONSIDERATIONS: There are no policy considerations that prohibit the proposal of this project.

PROPOSED PROJECT: Further investigation beyond the scope of this PA is proposed for CEHND.

CERTIFICATE OF CLEARANCE: Copies of Corps of Engineers letters dated 12 March 1948 are attached.

RISK ASSESSMENT PROCEDURES FOR EXPLOSIVE ORDNANCE: A RAC for this site is attached.

DISTRICT POC: Linda L. Wagner or Bruce K. Little, CEMRO-ED-EC, (402) 221-7643.

RISK ASSESSMENT PROCEDURES FOR ORDNANCE AND EXPLOSIVE WASTE (OEW) SITES

Site Name Armstrong County Air to Air Gunnery Range Rater's Name Deanna Pulse
Site Location Dewey and Sully County South Dakota Organization EA Engineering, Science and Technology, INC.
DERP Project No. B08SD081901 Organization
Date Completed March 31,1993 RAC Score 3

OEW RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882B and AR 385-10. The RAC score will be used by CEHND to prioritize the remedial action at this site. The OEW risk assessment should be based upon best available information resulting from records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observations, interviews, and measurements. This information is used to assess the risk involved based upon the potential OEW hazards identified at the site. The risk agreement is composed of two factors, hazard severity and hazard probability. Personnel involved in visits to potential OEW sites should view the CEHND videotape entitled "A Life Threatening Encounter: OEW."

Part I. Hazard Severity. Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel exposure to various types and quantities of unexploded ordnance items.

TYPE OF ORDNANCE
(Circle all values that apply)

A. Conventional Ordnance and Ammunition

	VALUE
Medium/Large Caliber (20 mm and larger)	10
Bombs, Explosive	10
Grenades, Hand and Rifle, Explosive	10
Landmines, Explosive	10
Rockets, Guided Missiles, Explosive	10
Detonators, Blasting Caps, Fuses, Boosters, Bursters	6
Bombs, Practice (w/spotting charges)	6
Grenades, Practice (w/spotting charges)	4
Landmines, Practice (w/spotting charges)	4
Small Arms (.22 cal - .50 cal)	1
Conventional Ordnance and Ammunition (Select the largest single value)	1

What evidence do you have regarding conventional OEW? Conversations with landowners from various locations revealed the findings of .50-caliber casings, points and occasional live ammunition. Current landowners had collected points and casings from .50-caliber ammunition.

B. Pyrotechnics (For munitions not described above.)

	VALUE
Munition (Container) Containing White Phosphorus or other Pyrophoric Material (i.e., Spontaneously Flammable)	10
Munition Containing a Flame or Incendiary Material (i.e., Napalm, Triethylaluminum Metal Incendiaries)	6
Flares, Signals, Simulators	4
Pyrotechnics (Select the largest single value)	0

What evidence do you have regarding pyrotechnics? _____

_____

C. Bulk High Explosives (Not an integral part of conventional ordnance; uncontainerized.)

	VALUE
Primary or Initiating Explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10
Demolition Charges	10
Secondary Explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	8
Military Dynamite	6
Less Sensitive Explosives (Ammonium Nitrate, Explosive D, etc.)	3
High Explosives Value (Select the largest single value)	0

What evidence do you have regarding bulk explosives? _____

_____

D. Bulk Propellants (Not an integral part of rockets, guided missiles, or other conventional ordnance; uncontainerized)

	VALUE
Solid or Liquid Propellants	6
Propellants Value	0

What evidence do you have regarding bulk propellants? _____

_____

E. Radiological/Chemical Agent/Weapons

	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25
War Gas Identification Sets	20
Radiological	15
Riot Control and Miscellaneous (Vomiting, Tear, Incendiary and Smoke)	5

Radiological/Chemical Agent (Select the largest single value) 0

What evidence do you have of chemical/radiological OEW? _____

_____

Total Hazard Severity Value 1
(Sum of Largest Values for A through E -- Maximum of 61).
Apply this value to Table 1 to determine Hazard Severity Category.

TABLE 1

HAZARD SEVERITY*

Description	Category	Value
CATASTROPHIC	I	≥21
CRITICAL	II	≥10 <21
MARGINAL	III	≥5 <10
NEGLIGIBLE	(IV)	≥1 <5
NONE**		0

* Apply Hazard Severity Category to Table 3.

** If Hazard Severity Value is 0, you do not need to complete Part II. Proceed to Part III and use a RAC score of 5 to determine your appropriate action.

Part II. Hazard Probability. The probability that a hazard has been or will be created due to the presence and other rated factors of unexploded ordnance or explosive materials on a formerly used DOD site.

AREA, EXTENT, ACCESSIBILITY OF OEW HAZARD
(Circle all values that apply)

A. Locations of OEW Hazards

	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or Other confined locations.	4
Inside walls, ceilings, or other parts of Buildings or Structures.	3
Subsurface	2

Location (Select the single largest value) 5

What evidence do you have regarding location of OEW? Landowners reported finding points, casings and live ammunition on the surface.

B. Distance to nearest inhabited locations or structures likely to be at risk from OEW hazard (roads, parks, playgrounds, and buildings).

Distance to Nearest Target	VALUE
Less than 1,250 feet	5
1,250 feet to 0.5 mile	4
0.5 mile to 1.0 mile	3
1.0 mile to 2.0 miles	2
Over 2.0 miles	1

Distance (Select the single largest value) 4

What are the nearest inhabited structures? Residences, farm buildings.

C. Numbers of Buildings within a 2 mile radius measured from the OEW hazard area, not the installation boundary.

	VALUE
26 and over	5
16 to 25	4
11 to 15	3
6 to 10	2
1 to 5	1
0	0

Number of Buildings (Select the single largest value) 5

Narrative Ammunition appeared to be scattered over the 404,439.41-acre site which includes farm and ranch residences, barns and sheds.

D. Types of Buildings (within a 2 mile radius)

	VALUE
Educational, Child Care, Residential, Hospitals, Hotels, Commercial, Shopping Centers	5
Industrial, Warehouse, etc.	4
Agricultural, Forestry, etc.	3
Detention, Correctional	2
No Buildings	0

Types of Buildings (Select the largest single value) 5

Describe types of buildings in the area. Farm and ranch homes, barns, machinery storage sheds.

E. Accessibility to site refers to access by humans to ordnance and explosive wastes. Use the following guidance:

Barrier	Value
No barrier or security system	5
Barrier is incomplete (e.g., in disrepair or does not completely surround the site). Barrier is intended to deny egress from the site, as for a barbed wire fence for grazing.	4
A barrier, (any kind of fence in good repair) but no separate means to control entry. Barrier is intended to deny access to the site.	3
Security guard, but not barrier	2
Isolated site	1
A 24-hour surveillance system (e.g., television monitoring or surveillance by guards or facility personnel) which continuously monitors and controls entry onto the facility; or An artificial or natural barrier (e.g., a fence combined with a cliff), which completely surrounds the facility; and a means to control entry, at all times, through the gates or other entrances to the facility (e.g., an attendant, television monitors, locked entrances, or controlled roadway access to the facility).	0

Accessibility (Select the single largest value) 4

Describe the site accessibility. Access to the site is partially restricted by natural barriers (Cheyenne River and Lake Oahe) along the south and east boundaries, by barbed wire fences for grazing along the west and north boundaries, and by restrictions on public access through the Cheyenne River Indian Reservation.

F. Site Dynamics - This deals with site conditions that are subject to change in the future, but may be stable at the present. Examples would be excessive soil erosion by beaches or streams, increasing land development that could reduce distances from the site to inhabitated areas or otherwise increase accessibility.

	VALUE
Expected	5
None Anticipated	0

Site Dynamics (Select largest value) 5

Describe the site dynamics. Farming activities continue to bring ammunition remnants to the surface.

Total Hazard Probability Value
(Sum of Largest Values for A through F--Maximum of 30) 28
Apply this value to Hazard Probability Table 2 to determine Hazard Probability Level.

TABLE 2

HAZARD PROBABILITY*

Description	Level	Value
FREQUENT	(A)	≥27
PROBABLE	B	≥21 <27
OCCASIONAL	C	≥15 <21
REMOTE	D	≥8 <15
IMPROBABLE	E	<8

* Apply Hazard Probability Level to Table 3.

Part III. Risk Assessment. The risk assessment value for this site is determined using the following Table 3. Enter with the results of the hazard probability and hazard severity values.

TABLE 3

Probability Level		FREQUENT A	PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
Severity Category:						
CATASTROPHIC	I	1	1	2	3	4
CRITICAL	II	1	2	3	4	5
MARGINAL	III	2	3	4	4	5
NEGLIGIBLE	IV	(3)	4	4	5	5

RISK ASSESSMENT CODE (RAC)

RAC 1 Imminent Hazard - Expedite INPR - Immediately call CEHND-ED-SY--commercial 205-955-4968 or DSN 645-4968.

RAC 2 High priority on completion of INPR - Recommend further action by CEHND.

(RAC 3) Complete INPR - Recommend further action by CEHND.

RAC 4 Complete INPR - Recommend further action by CEHND.

RAC 5 Recommend no further action. Submit NOFA and RAC to CEHND.

Part IV. Narrative. Summarize the documented evidence that supports this risk assessment. If no documented evidence was available, explain all the assumptions that you made.

Landowners reported findings .50-caliber casings, points, and occasional live ammunition on the surface and continue to find ammunition during farm activities. The ammunition appeared to be uniformly distributed throughout the site. The region is inhabited by farmers and ranchers with residences, barns, and storage buildings being the primary structures found on the site. The Cheyenne River and Lake Oahe Reservoir Project form natural barriers on the south and east boundary, however the remainder of the site is minimally secured. There is one hard-surface road through the Cheyenne River Indian Reservation reserved for tribal use. This road is patrolled by Reservation police, but the entrance is not barricaded. Barbed wire fences form barriers sporadically located on the west and north boundary of the site.

APPENDIX E

LETTERS / MEMORANDA / MISCELLANEOUS ITEMS

ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
ARCHIVES SEARCH REPORT
FINDINGS
ARMSTRONG COUNTY AIR-TO-AIR GUNNERY RANGE
Dewey and Sully Counties, South Dakota

Project Number B08SD081901

APPENDIX E
LETTERS/MEMORANDA/MISCELLANEOUS ITEMS

E-1 Report of Engineer Bomb and Shell Disposal Team, dated 6 December 1945.

E-2 Range Clearance Report and Certificates of Clearance, dated 5 September 1947 for Armstrong County Air-To-Air Gunnery Range including Little Bend Area Sully County.

E-3 Second Air Force Bombing And Gunnery Ranges, 30 May 1943, containing air-to-air range requirements and map showing Little Bend Area in Sully County.

E-1

Report of Engineer Bomb and Shell Disposal Team,
dated 6 December 1945.

BASIC: Ltr, Office of Division Engineer, Omaha, Nebr., dtd 2 Nov 45,
Sub: Rpt of Engineer Bomb & Shell Disposal Team.

601 MEDRM (S) 1st Ind.
HEADQUARTERS ARMY AIR BASE, Sioux City, Iowa, 6 December 1945.

TO: Division Engineer, Farm Credit Building, 206 South 19th Street, Omaha, Nebraska.

The following bombing ranges under the jurisdiction of this station have been inspected, policed, and neutralized to the best extent possible at this time of the year due to the considerable weed growth and snow in these areas and, accordingly, these ranges are certified as provisionally cleared within the meaning of paragraph 3 of the attached letter, Subject: Clearance of Bombing Ranges, Sioux City Air Base by Detachment No. 6, 9800 TSU:

√Cica Hollow Watertown Bombing Range - Watertown BR
Fort Sisseton, Watertown Bombing and Air to Ground Gunnery Range
Armstrong Indian Air to Air Range
Gann Valley Air to Ground Range - Mitchell Gunnery Bombing
Marshall Kimball Bombing Range
Springfield Bombing Range - Yankton " Bombing
Yankton Bombing Range -
Stanton Bombing Range
Elk Point Bombing Range

1 Incl
n/c

M. M. MUNN
Colonel, Air Corps
Commanding

Orig filed in
602 Sioux City Bombing
Ranges -
filed by 3rd Ind
dtd 12-18-45

- 2 -

ENCL 3

E-2

Range Clearance Report and Certificates of Clearance,
dated 5 September 1947 for Armstrong County Air-To-Air Gunnery Range
including Little Bend Area Sully County.

HEADQUARTERS
Det. #6 9800 TSU-CE
Bomb & Shell Disposal Team
Pierre, South Dakota

5 September 1947

TO: Office of Div. Engr., MRD, Farm Credit Bldg., Omaha 2, Nebraska

Subject; Clearance Report of Armstrong Aerial Gunnery Range, South Dakota

1. Detachment #6 9800 TSU-CE, Engineer Bomb & Shell Disposal Team, working under SO No. 11, Paragraph 1, dated 17 of July 1947, M.R.D. , Omaha, Nebraska, moved to Pierre, South Dakota for the purpose of decontaminating the Armstrong Aerial Gunnery Range, Armstrong County, South Dakota (Map Ref. Real Estate Map, Cover Sheet, Armstrong Aerial Gunnery Range, Armstrong County, S.D. Drawing No. SD 1, 4/17/46, Mr R. D., Omaha, Nebr.)

2. Information obtained from the Superintendent of Indian Affairs at Cheyenne Agency, S.D., the ranchers and farmers living on or near the range, And Mr. Ingram Hermanson, District Conservationist and Soil Conservation Service, Pierre, S.D. facilitated to a great extent the work to be done.

3. Personnel used consisted of 5 demolition technicians under the supervision of one officer worked a total of 432 man hours.

4. Due to the vast extent of the range area, vehicular patrol was used in inspecting all of the range except Segment K; Western Sully County Bombing Range; which was thouroughly searched on foot. All of the scrap metal found on Segment K. was gathered up and disposed of.

5. Segments A through J were free of all explosives and safe to be used for whatever the land is suited. Segment K was cleared of all scrap metal and is now also safe to used in any manner. No explosives or incendiary material was found on the entire range.

Asa B Luter

ASA B LUTER
Capt. CE
Commanding

CERTIFICATE OF CLEARANCE

5 September 1947

The entire Armstrong Aerial Gunnery Range and the Western Sully County Bombing Range (also known as the Little Bend Area Sully County Bombing Range) located approximately 30 miles northwest of Pierre, S.D. and 5 miles east of Eagle Butte, S.D., have been given a careful visual inspection and were found to be clear of all dangerous and/or explosive materials reasonably possible to detect. All the scrap metal on the bombing range has been disposed of. All of therange area, both gunnery and bombing are recommended for any use for which the land is suited.

Asa B Luter

ASA B LUTER
Capt. CE
9800 TSU-CE Det. 6
Bomb & Shell Disposal Team

CERTIFICATE OF CLEARANCE

5 September 1947

The entire Western Sully County Bombing Range (also known as the Little Bend Area Sully County Bombing Range) located approximately 30 miles northwest of Pierre, S.D. has been given a careful visual inspection and was found to be clear of all dangerous and/or explosive materials reasonably possible to detect. All the scrap metal on the bombing range has been disposed of. All of the bombing range area is recommended for any use for which the land is suited.

Asa B Luter

ASA B LUTER
Capt. CE
9800 TSU-CE DET 6
Bomb & Shell Disposal Team

E-3

Second Air Force Bombing And Gunnery Ranges, 30 May 1943, containing air-to-air range requirements and map showing Little Bend Area.

machine guns, 20 miles of width under those conditions is not too much to avoid hazard to persons or property. The length of 40 miles represents less than ten minutes of actual target practice and is necessary for development of gunnery accuracy in evasive tactical maneuvers.

(2) Required: These ranges are assigned to the Operational Wings and it is necessary to provide enough ranges within each Wing so that tow target facilities are within operational reach of all training bases and satellites. The tabulation in Annex 5 contains complete information on these requirements.

3. 58th Wing: Specific requirements for bombing and gunnery facilities in the 58th Wing have not been set forth in this presentation. This will be the initial Wing for the training of B-29 groups and crews and although continuous studies are being made it is not yet possible to establish a definite requirement of ranges for this Wing. Adequate range facilities will, obviously, be necessary and specific requests will be submitted as soon as minimum requirements can be determined.

4. When viewed in relation to the magnitude of the Second Air Force system and the tremendous production schedule for which commitments have been made, it becomes apparent that the requests of this Air Force for bombing and gunnery ranges have been most conservative. The great majority of Second Air Force ranges now acquired or being requested are located on waste or non-productive land or on lands of the lowest food-producing capacity in the operational training area of each base.

AUBRY L. MOORE,
Colonel, G. S. C.,
Chief of Staff.

AIR-TO-AIR GUNNERY RANGES

RANGE	USED BY
17th WING	
CENTRAL OREGON AERIAL GUNNERY RG. SOUTHEASTERN OREG. AERIAL GUNNERY (ALTERNATE PERIODS OF USE PROVIDE ONE YEAR-ROUND RANGE)	AAB WALLA WALLA AAB MADRAS AAB REDMOND
N.W. SEA FRONTIER TIDEWATER RG. (RIGHT OF SECONDARY USE THROUGH SEATTLE AIR DEFENSE WING) (See Note 1 Following Page)	AAB GEIGER FIELD AAB EPHRATA AAB MOSES LAKE
FORT PECK AERIAL GUNNERY RANGE	AAB GREAT FALLS AAB CUTBANK AAB LEWISTOWN. AAB GLASGOW
RAPID CITY AERIAL GUNNERY RANGE	AAB RAPID CITY AAB PIERRE AAB AINSWORTH
15th WING	
CRATERS OF THE MOON AERIAL GUN. SAYLOR CREEK AERIAL GUNNERY RG. (ALTERNATE PERIODS OF USE PROVIDE ONE YEAR-ROUND RANGE)	AAB GOWEN FIELD AAB MOUNTAIN HOME AAB POCATELLO
WENDOVER GENERAL RANGE	AAB WENDOVER FIELD
SPLIT-ROCK AERIAL GUNNERY RG.	AAB CASPER AAB SCOTTSBLUFF
ARMSTRONG COUNTY RANGE (See Note 2 Following Page)	AAB SIOUX CITY AAB WATERTOWN AAB SCRIBNER AAB MITCHELL
16th WING	
1 AIR-TO-AIR GUNNERY RG. REQUIRED (See Note 3 Following Page)	AAB BLYTHE AAB TUCSON
ALAMOGORDO GENERAL, RANGE	AAB ALAMOGORDO AAB EL PASO
CLOVIS AIR-TO-AIR RANGE (See Note 4 on 2nd Following Page)	AAB CLOVIS AAB PYOTE
1 AIR-TO-AIR GUNNERY RG. REQUIRED (See Note 5 on 2nd Following Page)	AAB DALHART AAB PUEBLO AAB LOWRY FIELD AAB Mc COOK
46th WING	
PROPOSED GULF RANGE (See Note 6 on 2nd Following Page)	AAB DYERSBURG AAB ALEXANDRIA AAB GALVESTON
58th WING	
SMOKY HILL RIVER AERIAL GUNNERY	AAB SALINA AAB WALKER AAB GREAT BEND AAB PRATT

AIR-TO-AIR GUNNERY RANGES

NOTE 1: (Northwest Sea Frontier Range)

An agreement for joint use of this range, subject to the use requirements of the Seattle Air Defense Wing and the Fourth Fighter Command, is being negotiated. Although the site is far beyond the reasonable operating limits of practice missions, the agreement is necessitated by the fact that exhaustive searches throughout western Washington and northern Idaho have failed to yield a suitable range location due to the density of agricultural, livestock and timber production. The use of the Tidewater Range should be continued only until a better location can be made available.

NOTE 2: (Armstrong County Aerial Gunnery Range)

The location of this range is far from ideal for use by units in training at Sioux City and its satellites. However, thorough investigation conducted throughout the Iowa, Nebraska and South Dakota areas within any possible operating range of the Sioux City bases reveals that this site is the most easily obtainable range within operating distance of these bases. Practically no dislocation of essential activities will result from this acquisition.

NOTE 3: (Tucson - Blythe Range)

Every possible effort has been made over a period of many months to locate an aerial gunnery range for these bases. The original Silver Bell area was not available due to Indian ownership and mining activity. An effort has been made through command channels (see basic letter) to obtain joint use of range areas had by other commands. Investigation is still being conducted for an obtainable site.

ARMY AIR BASE

RAPID CITY, SOUTH DAKOTA

142 Crews 2nd & 3rd Phase

Minimum Requirements:

4 Precision Bombing Ranges
1 Air-to-Ground Gunnery Ranges
1 Air-to-Air Gunnery Range (must be available)

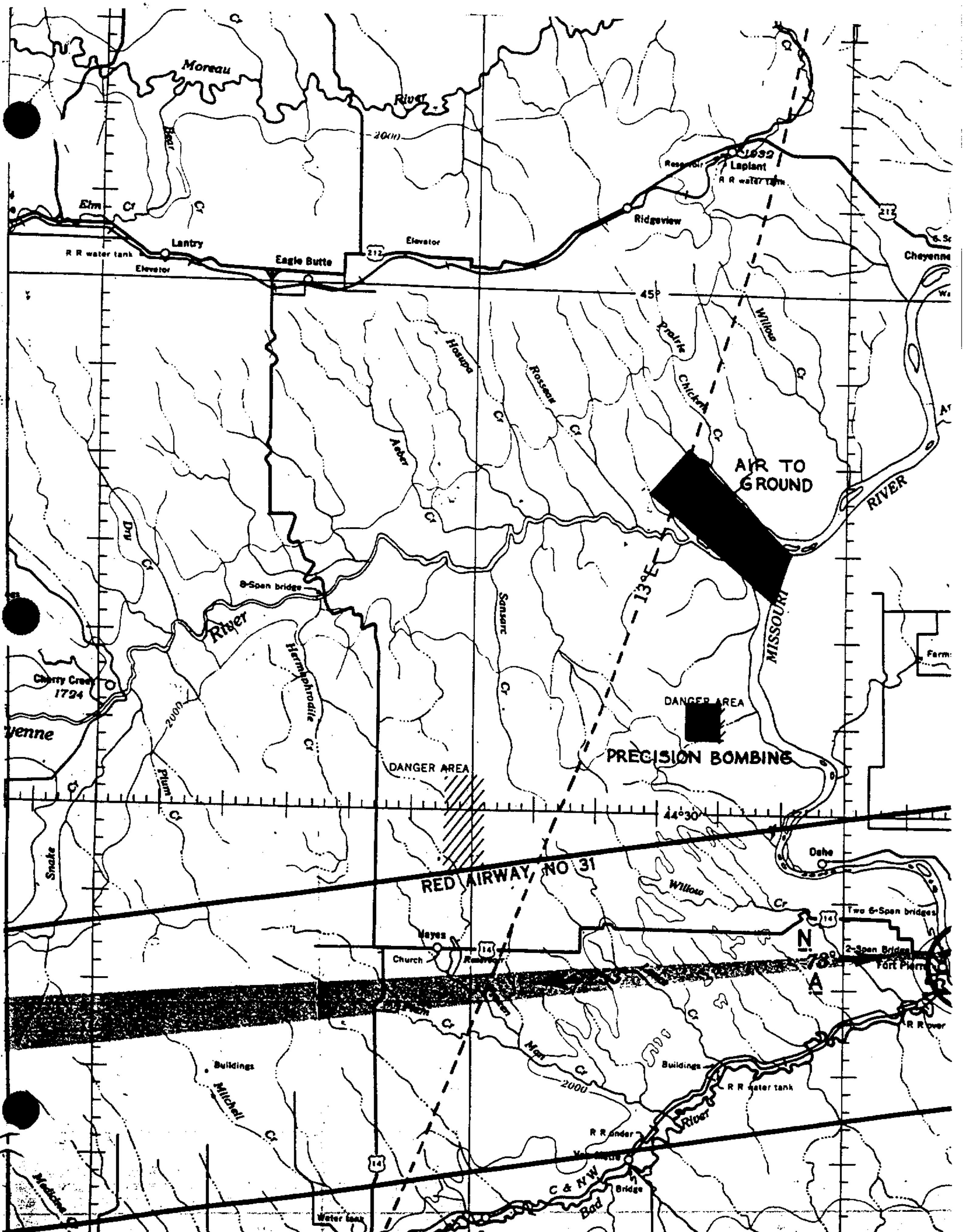
Available:

1 4x4 Precision Bombing Range - 40 miles N of Air Base
1 2x6 Air-to-Ground Gunnery Range - 27 miles NE of Air Base

Requested:

None. Search is now being conducted for suitable sites for 3 additional Precision Bombing Ranges.

This base will use the Rapid City Aerial Gunnery Range, a 12½ mile and 43 mile site 35 miles SSE of the Air Base.


Moreau
River
Bear Cr
Elm Cr
Lantry
R R water tank
Elevator
Eagle Butte
Elevator
Ridgeview
Laplant
R R water tank
Cheyenne
45°
Willow
Prairie
Chicken Cr
Hosupa Cr
Rosseau Cr
Aeber Cr
AIR TO
GROUND
RIVER
MISSOURI
Dry Cr
8-Span bridge
River
Sansarc Cr
Hermaphrodite Cr
13°E
Cherry Creek
1724
yenne
2000
Plum Cr
DANGER AREA
DANGER AREA
PRECISION BOMBING
44°30'
Snake
Oahe
RED AIRWAY NO 31
Willow Cr
Two 6-Span bridges
Hayes
Church
N
A
2-Span Bridge
Fort Pierre
Buildings
Mitchell Cr
Man Cr
2000
Buildings
R R water tank
River
R R under
C & N W
Bridge
Bad
Water tank
Medicine
R R over

APPENDIX F

REAL ESTATE DOCUMENTS
NOT USED

APPENDIX G

NEWSPAPERS / JOURNALS
NOT USED

APPENDIX H

INTERVIEWS

ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
ARCHIVES SEARCH REPORT
FINDINGS
ARMSTRONG COUNTY AIR-TO-AIR GUNNERY RANGE
Dewey and Sully Counties, South Dakota

Project Number B08SD081901

APPENDIX H -- INTERVIEWS

Individual Contacted	Position/Organization
Patty Anderson	Acting Director University Library School of Mines 501 East Saint Joseph Street Rapid City, SD 57701-3995 (605) 394-2418
Gregg Bourland	Chairman, Cheyenne River Sioux Tribe P.O. Box 590 Eagle Butte, SD 57625 (605) 964-4155
MSGT Christopher A. Corall	Chief, Explosive Ordnance Disposal Unit 28 CES/CED 840 White Street Ellsworth AFB, SD 57706 DSN 675-2873
Jim Fisher	Dewey County Sheriff 702 C Street P.O. Box 97 Timber Lake, SD 57656-0097 (605) 865-3330
Dave Nelson	Environmental Director Cheyenne River Sioux Tribe P.O. Box 590 Eagle Butte, SD 57625 (605) 964-6559/6558

Kathy Snyder Nelson	Editor, Timber Lake Topic (Newspaper) Member of Timber Lake Historical Society P.O. Box 10 Timber Lake, SD 57656-0010 (605) 865-3546
Germaine Means	Landowner P.O. Box 535 Eagle Butte, SD 57625
Michael C. Mullin	Director Watertown Regional Library 611 B Avenue, N.E. Watertown, SD 57201-0250 (605) 882-6226
Richard Popp	Chief Archivist Cultural Heritage Center South Dakota State Historical Society 900 Governors Drive Pierre, SD 57501-2217 (605) 773-3458
Michele Reid	Director of Public Services State of South Dakota Department of Education & Cultural Affairs South Dakota State Library 800 Governors Drive Pierre, SD 57501-2294
Dugan Smith	Project Officer ANA/DOD Environmental Department P.O. Box 590 Eagle Butte, SD 57625 (605) 964-6559/6558
Harry Thompson	Archivist Center for Western Studies Augustana College P.O. Box 727 Sioux Falls, SD 57197 (605) 336-4007

Dana R. Vaillancourt

Review & Compliance Coordinator
State Historic Preservation Office
South Dakota State Historical Society
Cultural Heritage Center
900 Governors Drive
Pierre, SD 57501-2217
(605) 773-3458

Michael J. Zuvanich

Commander
74th Ordnance Company (EOD) (Provisional)
52d Ordnance Group (EOD)
Ft. Riley, KS 66442
(913) 239-3313

Germaine Means: Ms. Germaine Means owns land in the middle of the former Armstrong Air-to-Air Gunnery Range and is a staff member for the Cheyenne River Sioux Tribal Chairman. Ms. Means recalls seeing planes flying over the Old Cheyenne Agency Camp Area with lead planes pulling streamers. She said the planes would dive to a low altitude out of her sight and she heard shooting. Ms. Means has seen empty shells and shells are still being found after a heavy rainfall.

TELEPHONE OR VERBAL CONVERSATION RECORD **DATE: 15 Aug 96**

For use of this form, see A-15; the proponent agency is the Adjutant General's Office.

SUBJECT OF CONVERSATION
Armstrong County Air-to-Air Gunnery Range

INCOMING CALL		
PERSON CALLING	ADDRESS	PHONE NUMBER AND EXTENSION
PERSON CALLED	OFFICE	PHONE NUMBER AND EXTENSION

OUTGOING CALL		
PERSON CALLING Kevin McCaffrey Quality Assurance Specialist	ADDRESS Corps of Engineers CELMS-PM-M (OEW) St. Louis, MO 63103	PHONE NUMBER AND EXTENSION (314) 331-8836
PERSON CALLED David Nelson Environmental Director	OFFICE Environmental Protection Department Cheyenne River Sioux Tribe P.O. Box 590 Eagle Butte, SD 57625	PHONE NUMBER AND EXTENSION (605) 964-6559

SUMMARY OF CONVERSATION:

I called Mr. Nelson to trace the origins of the 20mm practice projectile which he has in his office in Eagle Butte. Mr. Nelson said a man brought the 20mm in about 2 1/2 years ago. The man said his nephew had found it when he was riding one day. Mr. Nelson said the man left before he was able to get his name and no one in the office recognized him. Mr. Nelson has been unable to locate him since then. The only thing he is sure of is that the 20mm was found on tribal land and it is the only one his office is aware of.

APPENDIX I

PRESENT SITE PHOTOGRAPHS

ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
ARCHIVES SEARCH REPORT
FINDINGS
Armstrong County Air-to-Air Gunnery Range
Dewey and Sully Counties, South Dakota

Project Number B08SD081901

APPENDIX I -- PRESENT SITE PHOTOGRAPHS

PAGE	DESCRIPTION
<u>Page I-1</u>	
Photo #1	OE reportedly recovered from site. Display is located at the Cheyenne River Sioux Tribe Environmental Office. It includes live .50 caliber and .45-70 rounds, 20 mm, .50 caliber point and musket balls.
<u>Page I-2</u>	
Photo #2	.50 caliber casing observed on site.
<u>Page I-3</u>	
Photo #3	Red flags marking .50 caliber casings.
Photo #4	View to the south from the area of flagging shown in previous photographs.
<u>Page I-3</u>	
Photo #5	View of Lake Oahe at confluence of the Missouri and Cheyenne Rivers.

APPENDIX J

HISTORICAL PHOTOGRAPHS
NOT USED

APPENDIX K

HISTORICAL MAPS / DRAWINGS
NOT USED

APPENDIX L

SITE SAFETY AND HEALTH PLAN / SITE INSPECTION REPORT

ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
ARCHIVES SEARCH REPORT
FINDINGS
Armstrong County Air-to-Air Gunnery Range
Dewey and Sully Counties, South Dakota

Project Number B08SD081901

APPENDIX L

SITE SAFETY AND HEALTH PLAN/SITE INSPECTION REPORT

Site Specific Safety and Health Plan for Armstrong County Air-to-Air Gunnery Range, August 1996.

The Site Inspection Report is located in Section 6.0, ASR Findings and Section 2.4, ASR Conclusions and Recommendations.

SITE-SPECIFIC SAFETY AND HEALTH PLAN (SSHP)
for
Armstrong County Air-to-ground Gunnery Range
Dewey and Sully Counties, SD
B08SD081901

The purpose of this site visit is to reconnoiter, document, and photograph areas on the former Armstrong County Air-to-ground Gunnery Range suspected to be contaminated with unexploded ordnance and/or toxic chemical munitions.

SSHP PREPARED BY:	Gregg E. Kocher
OFFICE	USACE, CELMS-PM-M
ADDRESS	1222 Spruce St. St. Louis, MO
PHONE	(314) 331-8790
DATE PREPARED	07-23-96

SSHP REVIEWED/APPROVED BY: Hank Counts

NOTE: This SSHP is to be used only for non-intrusive site visits and must be approved by safety prior to the start of the field visit. All team members must read, and comply with the SSHP, and attend the safety briefings. The Site Safety and Health Officer (SSHO) shall ensure the Safety Briefing Checklist and the SSHP acceptance form (Appendix C) is filled out prior to the start of the site visit.

A. SITE DESCRIPTION AND PREVIOUS INVESTIGATIONS

1. Site Description

a. Size: Approximately 404,439 acres

b. Present Usage
(check all that apply)

[ ]	Military	[ ]	Recreational	[X]	Other (specify)
[ ]	Residential	[ ]	Commercial		grazing land
[ ]	Natural Area	[ ]	Industrial	[ ]	
[X]	Agricultural	[ ]	Landfill	[ ]	

[ ]	Secured	[ ]	Active	[ ]	Unknown
[X]	Unsecured	[X]	Inactive		

2. Past Uses: This range supported a number of army airfields for aerial gunnery practice. Fighters shot at targets towedby other aircraft. It is believed that only a portion of it was cleared in 1947 and 1948.

3. Surrounding Population (check all that apply)

[X]	Rural	[ ]	Residential	[ ]	Other (specify)
[ ]	Urban	[ ]	Industrial		_____
[ ]	Commercial				_____

4. Previous Sampling/Investigation Results

a. Ordnance/Explosives (OE) Encountered: Caliber .50 cartridge cases, bullets and live cartridges have been located or reported during previous visits.

b. Samples (Air, Water, Soil, Vegetation)

[X] No samples are available.
[ ] Samples available (in other reports)

Chemical	Concentration	Media	Location

B. DESCRIPTION OF ON-SITE ACTIVITIES
(check all that apply)

[X]	Walk-through	[X]	Drive-through	[ ]	Other (specify)
[ ]	On-Road	[X]	Off road	[ ]	_____
[ ]	On Path	[ ]	Off path	[ ]	_____

C. SITE PERSONNEL AND RESPONSIBILITIES

1. Responsibilities

a. Project Manager: The Corps of Engineers Project Manager (PM) is overall responsible for the site visit. He will assign a Team Leader, (most situation will be the PM). The PM will ensure that the SSHP is completed. Coordinates and executes the site visit.

b. Site Safety and Health Officer: Individual designated to conduct safety, enforce the SSHP, conduct safety briefings, and ensure that the team leader can safely fulfill his objectives. The SSHO will maintain the safety gear, and monitor on-site operations. The SSHO is responsible for identifying, marking, and reporting any unexploded ordnance and explosives.

2. Team Members

Name	Position	Address	Phone
Dennis Gilmore	PM/Team Leader	USACE, St. Louis, Mo	(314) 331-8108
Gregg Kocher	SSHO, UXO Spec	USACE, St. Louis, Mo	(314) 331-8790
Kevin McCaffrey	QASAS	USACE, St. Louis, MO	(314) 331-8836

D. OVERALL HAZARD EVALUATION:

[ ] High [ ] Moderate [X] Low [ ] Unknown

This assessment was developed using the Site Investigation Hazard Analysis and Risk Assessment Code Matrix.

E. GENERAL PRECAUTIONS: Prior to the on-site visit, all team members are required to read this SSHP and sign the form acknowledging that they have read and will comply with it. In addition, the SSHO shall hold a brief tailgate meeting in which site specific topics regarding the days activities will be discussed. If unanticipated hazardous conditions arise, team members are to stop work, leave the immediate area and notify the SSHO. The buddy system will be enforced at all times.

F. STANDARD OPERATION SAFETY PROCEDURES, ENGINEERING CONTROLS AND WORK PRACTICES

1. Site Rules/Prohibitions: At any sign of unanticipated hazardous conditions, stop tasks, leave the immediate area and notify the SSHO. Smoking, eating and drinking allowed in designated areas only.

2. **Material Handling Procedures:** Do not handle.

3. **Drum Handling Procedures:** Do not handle.

4. **Confined Space Entry:** A area identified as a Permit Required Confined space will not be entered. All confined spaces shall be considered permit required confined spaces until the pre-entry procedures demonstrate otherwise. Confined spaces may be entered without a written permit or attendant provided the space is determined not to be a permit required confined space as specified in 29 CFR 1910.146.

5. **Electrical Protection:** Overhead power lines, downed electrical wires and buried cables pose a danger of shock and electrocution. In addition, buildings may contain exposed wiring that may hold a potential load. Workers should avoid contact with any and all exposed wire and cables

6. **Spill Containment:** N/A

7. **Excavation Safety:** Do not enter trenches/excavations.

8. **Illumination:** Site visits will be conducted during daylight hours only.

9. **Sanitation:** Use existing sanitary facilities.

10. **Buddy System:** Individuals will maintain constant contact with other personnel at all times. No one will work alone at any time during the site visit.

11. **Engineering Controls:** N/A

12. **Insects:** Wearing light colored clothing and tucking in the pant legs can reduce contact. In severely infested area it may be necessary to tape all openings. Apply repellents to both clothing and bare skin. Diethyltoluamide (DEET) is an active ingredient in many repellents, which are effective against ticks and other insects. Repellents containing DEET can be applied on exposed areas of skin and clothing. However, repellents containing permethrin should be used on only clothing. For more information on insect bites, refer to Appendix B.

13. **Poisonous Vegetation:** Recognition and avoidance is the best protection. Cover all exposed skin. If it is known or suspected that an individual has been exposed, wash the effected area with soapy water.

14. **Inclement Weather:** When there are warnings or indications of impending severe weather (heavy rains, strong winds, lightning, tornados, etc.), weather conditions shall be monitored and appropriate precautions taken to protect personnel and property from the effects of the severe weather.

15. Hot Weather: In hot environments, cool drinking water shall be made available and workers shall be encouraged to frequently drink small amounts, e.g., one cup every 15 - 20 minutes: the water shall be kept reasonably cool. In those situations where heat stress may impact worker safety and health, work regimens shall be established. Environmental monitoring of the Wet Bulb Globe Temperature Index shall be conducted and work loads and work regimens categorized as specified in the American Conference of Governmental Industrial Hygienist (ACGIH) publication "Threshold Limit Values and Biological Exposure Indices". For more information on Heat Stress refer to Appendix A of this SSHP.

16. Cold Weather: Cold injury (frost bite and hypothermia) and impaired ability to work are dangers at low temperatures and when the wind-chill factor is low. To guard against them: wear appropriate clothing; have warm shelter readily available; carefully schedule work and rest periods, and monitor workers' physical conditions.

17. Off-Road Driving: Ensure all emergency equipment is available with the vehicle i.e. tire changing equipment. Drivers shall familiarize themselves with the procedures for engaging four-wheel drive systems before the need for added traction arises. Vehicles will not be driven into an environment that is unknown, such as deep water, or an unstable surface. Vehicles will not be driven into a suspected ordnance impact area.

18. Ordnance:

a. General Information

(1) The cardinal principle to be observed involving explosives, ammunition, severe fire hazards or toxic materials is to limit the exposure to a minimum number of personnel, for the minimum amount of time, to a minimum amount of hazardous material consistent with a safe and efficient operation.

(2) The age or condition of an ordnance item does not decrease the effectiveness. Ordnance that has been exposed to the elements for extended periods of time become more sensitive to shock, movement, and friction, because the stability agent in the explosives may be degraded.

(3) When chemical agents may be present, further precautions are necessary. If the munitions item has green markings leave the area immediately, since it may contain a chemical filler.

(4) Consider ordnance that has been exposed to fire as extremely hazardous. Chemical and physical changes may have occurred to the contents which render it more sensitive than it was in its original state.

b. On-Site Instructions

(1) DO NOT TOUCH or MOVE any ordnance items regardless of the markings or apparent condition.

(2) DO NOT conduct a site visit during an electrical storm or an approaching electrical storm. If a storm approaches during the site visit leave the site immediately and seek shelter.

(3) DO NOT use a radio or cellular phone in the vicinity of a suspect ordnance item.

(4) DO NOT walk across an area where the ground cannot be seen.

(5) DO NOT drive a vehicle into a suspected OE area; use clearly marked lanes.

(6) DO NOT carry matches, cigarettes, lighters or other flame producing devices into a OE site.

(7) DO NOT rely on color code for positive identification of ordnance items or their contents.

(8) Approach ordnance items from the side; avoid approaching from the front or rear.

(9) Always assume ordnance items contain a live charge until it can be determined otherwise.

(10) Dead vegetation and animals may indicate potential chemical contamination. If a suspect area is encountered, personnel should leave the immediate area and evaluate the situation before continuing the site visit.

c. Specific Action Upon Locating Ordnance

(1) DO NOT touch, move or jar any ordnance item, regardless of its apparent condition.

(2) DO NOT be misled by markings on the ordnance item stating "practice", "dummy", or "inert". Practice munitions may contain an explosive charge used for spotting the point of impact. The item may also be mismarked.

(3) DO NOT roll the item over or scrape the item to read the markings.

(4) The location of any ordnance items found during site investigations should be clearly marked so it can be easily located and avoided.

(5) Reporting will be conducted in accordance with CELMS-PM-M, Standard Operating procedure for Reporting Ordnance and Unexploded Ordnance (UXO), dated 19 January 1995.

19. Other: (specify)

G. SITE CONTROL AND COMMUNICATIONS

1. Site Map: Refer to Appendix A

2. Site Work Zones: N/A

3. Buddy System: Individuals will maintain constant contact with other personnel at all times. No one will work alone at any time during the site visit.

4. Communications

a. On-Site: Verbal communications will be used among team members.

b. Off-Site: Communications shall be established on every site. Communications may be established by using an cellular phone or by public or private phone which may be readily accessible. (specify below)

[X] Cellular phone

[ ] Public/private phone (location_____

[ ] Other _____

c. Emergency Signals: In the case of small groups, a verbal signal for emergencies will suffice. An emergency signal for large groups (i.e. air horn, whistle) should be incorporated at the discretion of the SSHO.

[ ] Verbal
[X] Nonverbal (specify) Whistle

H. EMERGENCY RESPONSE: Team members are to be alert to the dangers associated with the site at all times. If an unanticipated hazardous condition arises, stop work, evacuate the immediate area and notify the SSHO. A First Aid Kit and emergency eye wash (if applicable) will be located in the SSHO's field vehicle. If qualified persons (i.e. fire department, medical facility or physician) are not accessible within five minutes of the site at least two team members shall be qualified to administer first aid and CPR.

1. Emergency/Important Telephone Numbers

Hospital, Eagle Butte . . . . . (605) 964-7724

Dewey County Sheriff . . . . . (605) 856-3330

546th EODCT . . . . . (210) 221-1308
88th EOD, Fort McCoy, WI . . . . . (608) 388-3315

Huntsville Safety Office: . . . . . (205) 895-1582/1579
Huntsville's 24 hour number: . . . . . (800) 627-3532, PIN 777-2534
On-site cellular phone 630-5801
St Louis Corps of Engineers . . . . . (314) 331-8036

2. Hospital/Medical Facility Information

Name: Meade County Medical Center (no 911 service)
Address: Sturgis, SD

Phone: (605) 964-7724

Distance to hospital: approx. 15 miles

Route to Hospital: refer to the site map

I. MONITORING EQUIPMENT AND PROCEDURES

1. Exposure Monitoring: For non-intrusive on-site activities such as site visits, air monitoring is typically not required. However, if the site situation dictates the need for monitoring, complete the following information on a separate page and attach the page to the SSHP.

a. Monitoring Equipment To Be Utilized: N/A

b. Equipment Calibration Results: N/A

c. Action Levels: N/A

2. Heat/ Cold Stress Monitoring

a. Heat Stress monitoring criteria published in Chapter 8 of the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities"shall be followed.

b. Cold Stress monitoring shall be conducted in accordance with the most current published American Conference of Governmental Industrial Hygienists (ACGIH) cold stress standard..

J. PERSONAL PROTECTIVE EQUIPMENT: Typically, for non-intrusive site visits, Level D is required. If a higher level of protection is to be used initially or as contingency, a brief discussion will be attached. At a minimum personnel shall wear clothing suitable for the weather and work condition. The minimum for field work shall be short sleeve shirt, long trousers, and leather or other protective work shoes or boots. If a higher level of protection is to be used initially or as contingency, a brief discussion will be attached.

1. Footwear: Footwear providing protection against puncture shall meet the applicable requirements as stated in EM 385-1-1, paragraph 05.A.07. All activities which personnel are potentially exposed to foot hazards will be identified and documented in a hazard analysis.

2. Hand Protection: Persons involved in activities which subject the hands to injury (e.g., cuts, abrasions, punctures, burns) shall use leather gloves.

3. Head Protection: Hard hats shall be worn when personnel are subject to potential head injury. The identification and analysis of head hazards will be documented in a hazard analysis.

i. **Eye Protection:** Personnel will wear eye protection when activities present potential injuries to the eyes. All eye protection equipment shall meet the requirements as stated in EM 385-1-1, paragraph 05.B.

K. DECONTAMINATION PROCEDURES: Decontamination procedures are not anticipated for this site investigation. Team members are cautioned not to walk, kneel or sit on any surface with potential leaks, spills or contamination.

L. TRAINING: All site personnel shall have completed the training required by EM 385-1-1 and 29 CFR 1910.120 (e). The U.S. Army Corps of Engineer (USACE) Project Manager shall ensure, and the SSHO shall verify, that all on-site personnel have completed appropriate training. Additionally, the SSHO shall inform personnel before entering, of any potential site-specific hazards and procedures.

M. MEDICAL SURVEILLANCE PROGRAM: The USACE Project Manager shall ensure, and the SSHO shall verify, that all on-site personnel are on the Medical Surveillance Program meeting the requirements of 29 CFR 1910.120, and ANZI Z-88.2, as appropriate, depending on the PPE and site specific tasks.

Provide the following information on Training and Medical

NAME	HAZWOPER DATE	PROVIDER	MEDICAL DATE
Dennis Gilmore	12-95	Corps of Engineers	12-95
Gregg Kocher	01-96	Corps of Engineers	07-96
Kevin McCaffrey	12-95	Corps of Engineers	09-95

N. LOGS, REPORTS AND RECORD KEEPING: Site logs are maintained by the Project Manager and SSHO. This is to include historical data, personnel authorized to visit the site, all records, standard operating procedures, air monitoring logs and the SSHP.

O. GENERAL: The number of personnel visiting the site shall be a limited to a minimum of two, maximum of eight. The more personnel on-site, the greater potential for an accident. The SSHO may modify this SSHP if site conditions warrant it and without risking the safety and health of the team members. This modification will be coordinated with the team members. The SSHO shall notify Corps of Engineers Safety Office in Huntsville, AL. of the change as the situation allows.

APPENDIX A

HEAT- RELATED INJURIES

Once the signals of a heat-related illness begin to appear, the victim's condition can quickly get worse. A heat related illness can result in death. If you see any of the signals of sudden illness, and the victim has been exposed to extremes of heat, suspect a heat-related illness.

People at risk for heat-related illness include those who work or exercise outdoors, elderly people, young children, and people with health problems. Also at risk are those who have had a heat-related illness in the past, those with medical conditions that cause poor blood circulation, and those who take medications to get rid of water from the body (diuretics).

People usually try to get out of extreme heat before they begin to feel ill. However, some people do not or can not. Those that work outdoors often keep working even after they begin to feel ill. Many times, they might not even recognize that they are in danger of becoming ill.

Heat cramps, heat exhaustion, and heat stroke are conditions caused by overexposure to heat. You can help prevent heat-stress emergencies by recognizing and properly treating symptoms. Below is a quick reference guide to heat-related emergencies:

HEAT CRAMPS: Heat cramps are the least severe, and often are the first signals that the body is having trouble with the heat. *Symptoms* include: Muscle twitching; painful spasms in the legs, arms or abdomen.

WHAT TO DO:
- Have the individual rest in a cool place.
- Give cool water or a commercial sports drink.
- lightly stretch the muscle and gently massage the area.

HEAT EXHAUSTION: Heat exhaustion is a more severe condition than heat cramps. *Symptoms* include: cool, moist, pale, or flushed skin, headache, nausea, dizziness, weakness, and exhaustion.

HEAT STROKE: Heat stroke is the least common but most severe heat emergency. It most often occurs when people ignore the signals of heat exhaustion. Heat stroke develops when the body systems are overwhelmed by heat and begin to stop functioning. **Heat stroke is a serious medical emergency.** *Symptoms* include: red, hot, dry skin; changes in consciousness; rapid, weak pulse; and rapid, shallow breathing.

WHAT TO DO: When you recognize a heat-related illness in its early stages, you can usually reverse it.

- Get the victim out of the heat.

- Loosen any tight clothing and apply cool, wet cloths, such as towels or sheets.

- If the victim is conscious, give cool water to drink. Do not let the conscious victim drink too quickly. Give about 1 glass (4 ounces) of water every 15 minutes.

- Let the victim rest in a comfortable position, and watch carefully for changes in his or her condition. The victim should not resume normal activities the same day.

- Refusing water, vomiting, and changes in consciousness mean that the victim's condition is getting worse. Call for an ambulance immediately if you have not already done so.

- If the victim vomits, stop giving fluids and position them on their side.

- Watch for signals of breathing problems.

- Keep the victim lying down and continue to cool the body any way you can. If you have ice packs or cold packs, place them on each of the victim's wrists and ankles, on the groin, in each armpit, and on the neck to cool the large blood vessels.

APPENDIX B

BITES AND STINGS

Scorpions, Bees and Spiders

Bee stings are painful, but rarely fatal. Some people, however have a severe allergic reaction to an insect sting. This allergic reaction may result in a breathing emergency. If someone is stung by an insect, remove the stinger. Scrape it away with from the skin with your fingernail or plastic car, such as a credit card, or use tweezers. If you use the tweezers, grasp the stinger, not the venom sac. Wash the site with soap and water. Cover it to keep it clean. Apply a cold pack to the area to reduce the pain and swelling. Watch the victim for signals of an allergic reaction.

Scorpions live in dry regions of the southwestern United States and Mexico. They live under rocks, logs, and the bark of certain trees and are most active at night. Only a few species of scorpions have a sting that can cause death.

Spiders; there are also only two spiders in the United States whose bite can make you seriously sick or be fatal. These are the black widow spider and the brown recluse. The black widow is black with a reddish hourglass shape on the underside of its body. The brown recluse is light brown with a darker brown, violin-shaped marking on the top of its body. Both spiders prefer dark, out of the way places. Often, the victim will not know that he or she has been bitten until he or she starts to feel ill or notices a bite mark or swelling.

Symptoms include nausea and vomiting, difficulty breathing or swallowing, sweating and salivating much more than normal, severe pain in the sting or bite area, a mark indicating a possible bite or sting, and swelling of the area.

First Aid: If someone has been stung by a scorpion or bitten by a spider he or she thinks is a black widow or brown recluse, wash the wound, apply a cold pack to the site, and get medical help immediately.

Lyme Disease

Lyme Disease is an illness that people get from the bite of an infected tick. Lyme disease is affecting a growing number of people in the United States. Everyone should take precautions against it. Not all ticks carry lyme disease. Lyme disease is spread mainly by a type of tick that commonly attaches itself to field mice and deer. It is sometimes called a deer tick. This tick is found around beaches and in wooded and grassy areas. like all ticks, it attaches itself to any warm-blooded animal that brushes by. Deer ticks are very tiny and difficult to see. They are much smaller than the common dog tick or wood tick. They can be as small as a poppy seed or the head of a pin. Adult deer ticks are only as large as a

grape seed.

Symptoms: The first signal of infection may appear a few days or a few weeks after a tick bite. Typically, a rash starts as a small red area at the site of the bite. It may spread up to 7 inches across. In fair-skinned people the center is lighter in color and the outer edges are red and raised. This sometimes gives the rash a bull's-eye appearance. In dark skinned people the area may look black and blue, like a bruise.

Other symptoms include fever, headache, weakness, and joint and muscle pain similar to the pain of "flu". These symptoms might develop slowly and might not occur at the same time as a rash. In fact you can have lyme disease without developing a rash.

First Aid: If you find a tick, remove it by pulling steadily and firmly. Grasp the tick with fine-tipped tweezers, as close to the skin as possible, and pull slowly. If you do not have tweezers, use glove, plastic wrap, or a piece of paper to protect you finger. If you use your bare fingers, wash your hands immediately. Do not try to burn a tick or use other home remedies, like coating the tick with Vaseline or nail polish or picking it with a pin. Once the tick is removed, wash the area with soap and water. If available, apply antiseptic or antibiotic ointment. If you can not remove the tick or parts of the tick stay in your skin, obtain medical care. If a rash or flu like symptoms develop, seek medical attention.

APPENDIX C

SSHP ACCEPTANCE FORM

ABBREVIATED SITE SAFETY AND HEALTH PLAN

FOR

Armstrong County Air-to-air Gunnery Range

Dewey and Sully Counties, SD

I have read and agree to abide by the contents of the Site Safety and Health Plan.

NAME	OFFICE	SIGNATURE	DATE
Dennis Gilmore	CELMS-PM-M		24 Jul 96
Gregg Kocher	CELMS-PM-M		24 Jul 96
Kevin McCaffrey	CELMS-PM-M		24 July 96

SITE SURVEY SAFETY BRIEFING

(Check subjects discussed)

Date 5 AUG 96

GENERAL INFORMATION

- ✓ Purpose of Visit
- ✓ Identify Key Site Personnel

SITE SPECIFIC INFORMATION

- ✓ Site Description/Past Use
- ✓ Results of Previous studies
- ✓ Potential Site Hazards
- ✓ OE Safety Procedures
- ✓ Site SOP
- ✓ Site Control and Communications
- ✓ Emergency Response
  - ( ) Location of First aid Kit
  - ( ) Emergency Phone Numbers
  - ( ) Map to Facility
- ✓ PPE
- ✓ Weather Precautions
  - ( ) Cold/Heat
  - ( ) Severe Weather

Safety Briefing Attendance

All team members and any accompanying personnel will be briefed and sign this form:

NAME (Print)	ORGANIZATION	SIGNATURE
Dennis Gilmore	USACE-STL, Project Manager	
Gregg Kocher	USACE-STL, Safety Specialist	
Kevin McCaffrey	USACE-STL, OASAS	

Site investigation Hazard Analysis

Activity: Site Investigation **Analyzed by/Date:** G. Kocher 22 Jul 96 **Reviewed by/Date:** [illegible] 22 Jul 96

Operation	**Hazard** Potential Energy	**Cause** Stimuli	**Effect** Mishaps Results	**RAC** w/o controls	**Countermeasures** Hazard Controls	**RAC** Con-troled
Site investigation	Explosives unexploded ordnance	detonation	puncture wounds, amputation, death	I,D,3	do not touch or disturb, avoidance	I,E,5
	slippery, uneven surface	slip, trips and falls	sprains, strains fractures	III,D,5	attentiveness, avoidance, approved footwear	III,E,5
	sharp pointed objects	punctures	foot injury	III,D,5	approved footwear	IV,E,5
	branches	contact	eye injuries	III,D,5	eye protection	IV,E,5
	poisonous reptiles	bites	sickness, death	II,D,5	avoidance	II,E,5
	animals	bites	punctures, lacerations, rabies	II,D,5	avoidance	II,E,5
	insects	bites	sickness, discomfort	IV,C,5	insect repellant, proper clothing	IV,D, 5
	poisonous vegetation	contact	rash	IV,C,5	proper clothing, laundered work clothing.	IV,D, 5
	solar/heat	exposure	sun burn, heat exhaustion, heat stress, heat stroke	III,C,4	long pants, long sleeve shirts, lotion, water consumption	IV,D, 5

Operation	**Hazard** Potential Energy	**Cause** Stimuli	**Effect** Mishaps Results	**RAC** w/o controls	**Countermeasures** Hazard Controls	**RAC** con-troled
Site investigation continued						
	chemicals	physical contact, skin absorption, exhalation	skin rash, toxic effects	I,D,3	recognition, avoidance, appropriate PPE	III,D,5
	off-road driving	vehicle accident	injury	I,D,3	defensive driving prudence	I, E, 5

RISK ASSESSMENT CODE MATRIX

Hazard Severity	Hazard Probability				
	A Frequent	B Probable	C Occasional	D Remote	E Improbable
I Catastrophic	1	1	2	3	5
II Critical	1	2	3	4	5
III Marginal	2	3	4	5	5
IV Negligible	3	4	5	5	5

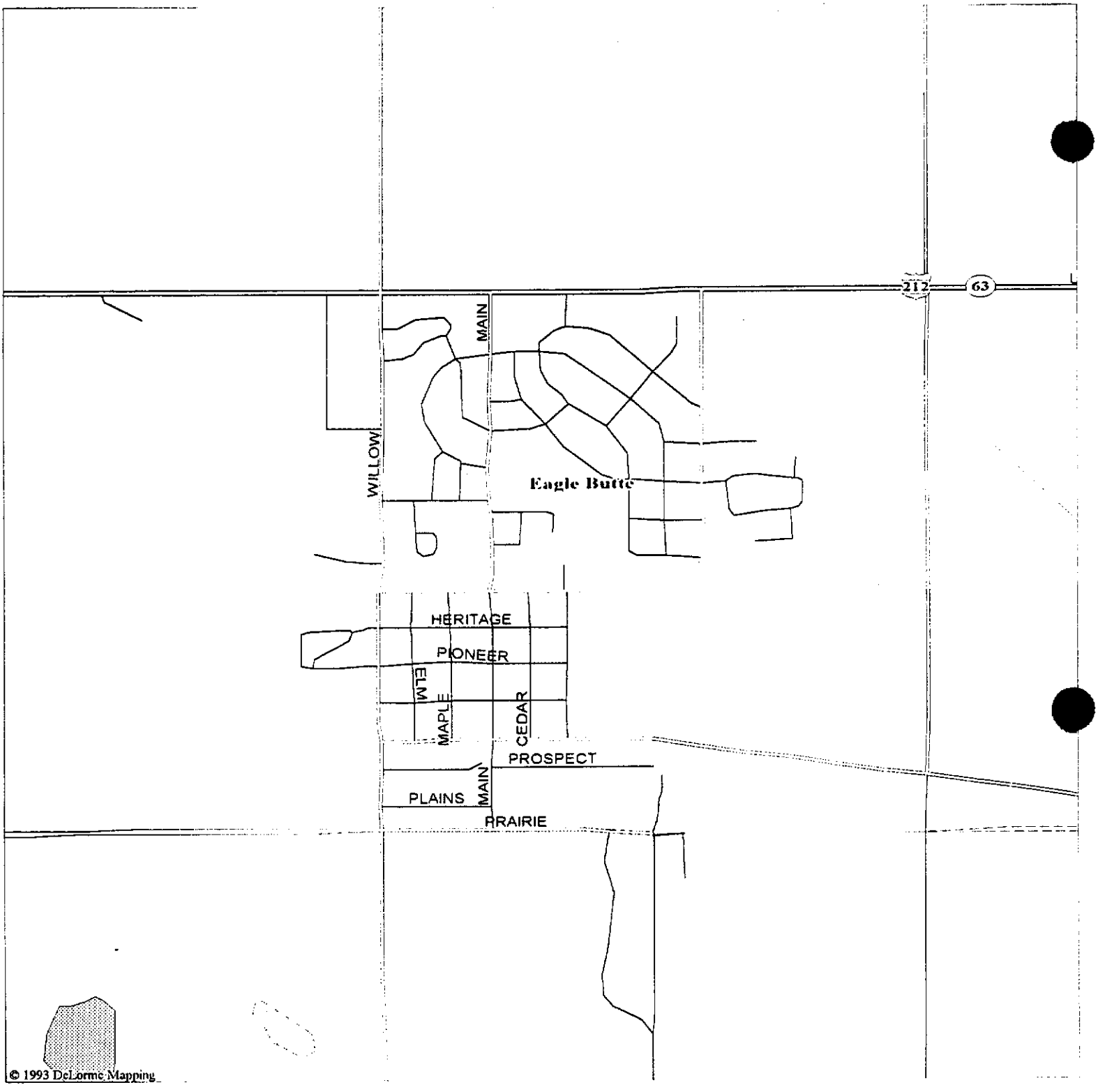
Hazard Severity

Description	Category	Mishap Definition
Catastrophic	I	Death or permanent total disability.
Critical	II	Permanent partial disability or temporary total disability in excess of (3) months.
Marginal	III	Minor injury, lost workday accident, or compensable injury or illness.
Negligible	IV	First aid or minor supportive medical treatment.

Hazard Probability

Description	Level	Event
Frequent	A	Likely to occur frequently during the project.
Probable	B	Will occur several times during the project.
Occasional	C	Likely to occur sometime during the project.
Remote	D	Unlikely, but possible to occur during the project.
Improbable	E	So unlikely it can be assumed occurrence may not be experienced during the project.

Risk Assessment Code	Hazard Evaluation
1,2	High
3	Moderate
4,5	Low



LEGEND

- Population Center
- State Route
- Town, Small City
- US Highway
- County Boundary
- Street, Road
- Major Street/Road
- US Highway
- Airfield
- Open Water

Scale 1:15,625 (at center)

1000 Feet

500 Meters

Mag 15.00
Mon Jul 22 10:21:29 1996

APPENDIX M

REPORT DISTRIBUTION LIST

ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
ARCHIVES SEARCH REPORT
FINDINGS
Armstrong County Air-to-Air Gunnery Range
Dewey and Sully Counties, South Dakota

Project Number B08SD081901

APPENDIX M -- REPORT DISTRIBUTION LIST

Addressee	No. Copies
Commander, U.S. Army Engineering and Support Center, Huntsville ATTN: CEHNC-ED-SY P.O. Box 1600 Huntsville, Alabama 35807-4301	2
Project Manager Chemical Demilitarization, Non-Stockpile ATTN: SFAE-CD-N, Bldg. E4585 Aberdeen Proving Ground, Maryland 21010-5401	1
Commander, U.S. Army Chemical & Biological Defense Command ATTN: AMSCB-CIH, Bldg E5183 Aberdeen Proving Ground, Maryland 21010-5423	1
U.S. Army Technical Center for Explosives Safety ATTN: SMCAC-ESM Savannah, Illinois 61074-9639	1
Commander, U.S. Army Engineer District, Omaha ATTN: CEMRO-ED-EC 215 North 17th Street Omaha, NE 68102-4978	3

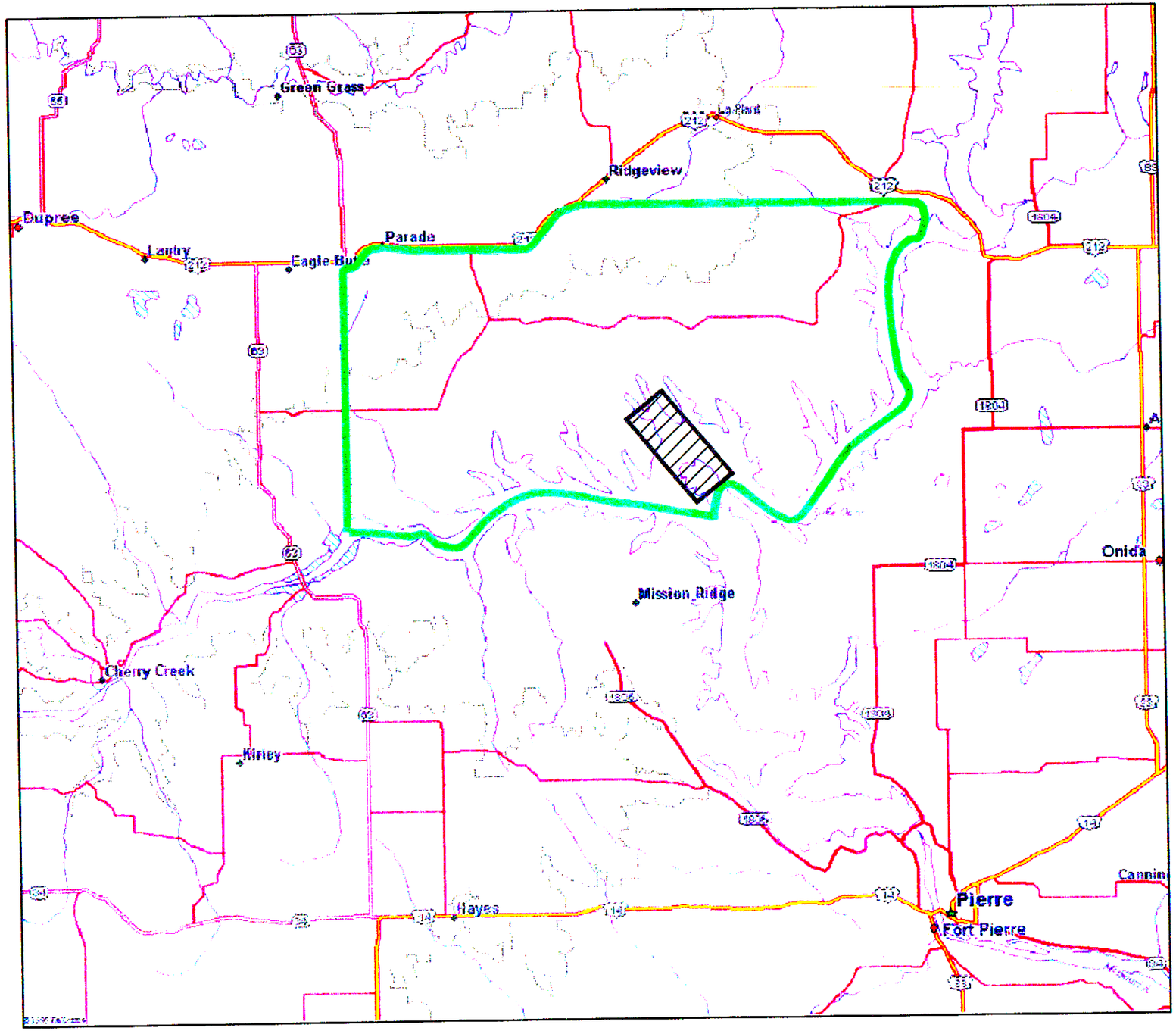
REPORT PLATES

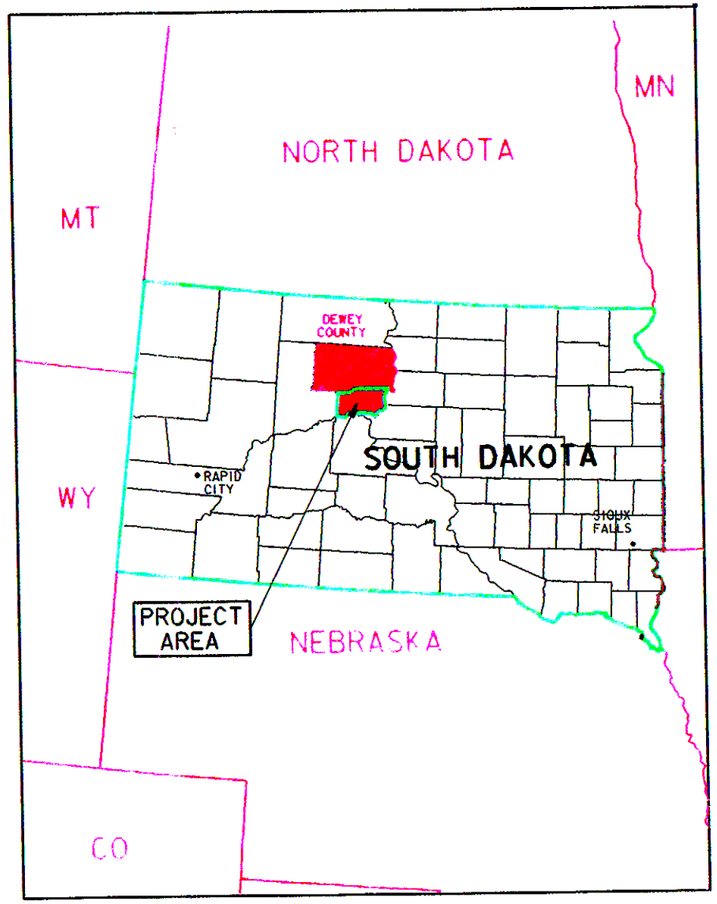
ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS
ARCHIVES SEARCH REPORT
FINDINGS
ARMSTRONG COUNTY AIR-TO-AIR GUNNERY RANGE
Dewey and Sully Counties, South Dakota

Project Number B08SD081901

REPORT PLATES

Plate 1	Vicinity Map
Plate 2	Site Map
Plate 3	Findings





LEGEND

SITE LOCATION

LITTLE SULLY BEND ATG

N

NOT TO SCALE

PLATE I

ARMSTRONG COUNTY AIR TO AIR GUNNERY RANGE DEWEY & SULLY COUNTIES, S D PROJECT# B08SD081901 VICINITY MAP

PROJ. DATE: JUNE 1996	DATE OF MAP: 1995
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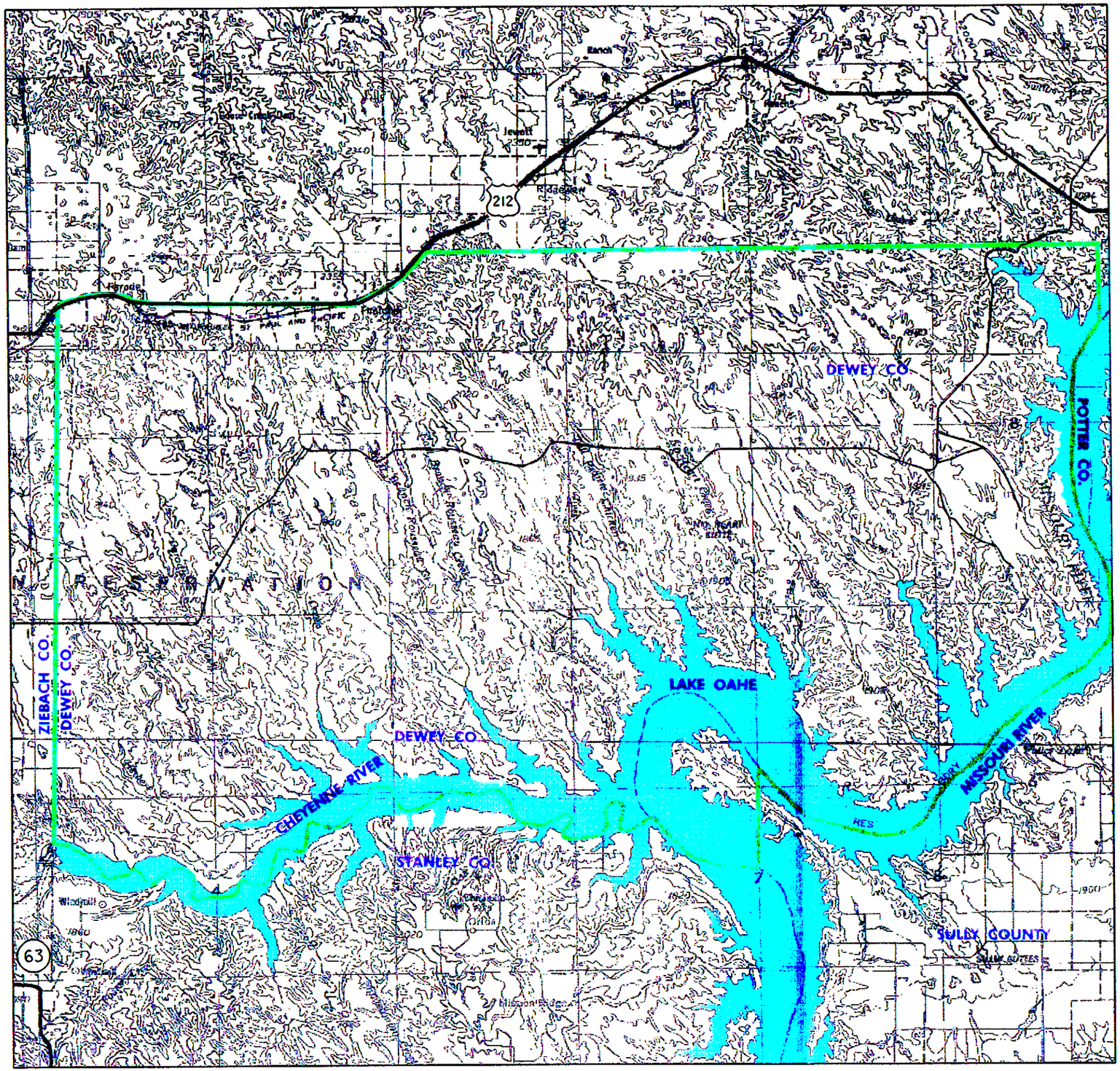

LEGEND

SITE LOCATION

0 4 8

APPROXIMATE SCALE IN MILES

N

PLATE 2

ARMSTRONG COUNTY
AIR TO AIR GUNNERY RANGE
DEWEY & SULLY COUNTIES, S D
PROJECT# B08SD081901
SITE MAP

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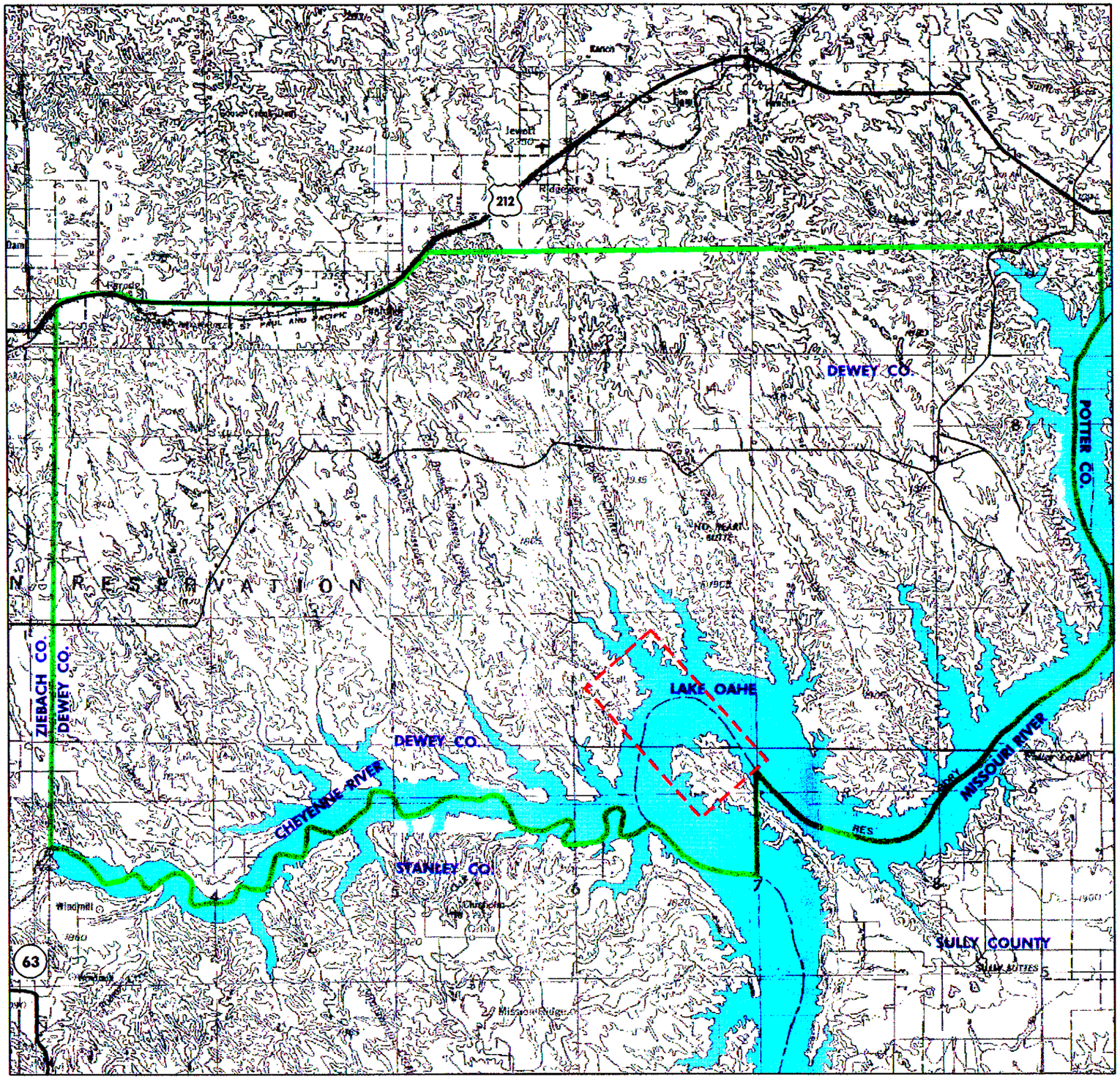

LEGEND

SITE LOCATION

LITTLE SULLY BEND ATG

0 4 8

APPROXIMATE SCALE IN MILES

N

PLATE 3

ARMSTRONG COUNTY
AIR TO AIR GUNNERY RANGE
DEWEY & SULLY COUNTIES, S D
PROJECT# B08SD081901
FINDINGS

PROJ. DATE: JUNE 1996	DATE OF QUADS: 1954
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